

BOYLE
—
THE
SCEPTICAL
CHYMIST

1680







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THE
Sceptical Chymist:
OR
CHYMICO-PHYSICAL
Doubts & Paradoxes,
Touching the
EXPERIMENTS
WHEREBY
VULGAR SPAGIRISTS
Are wont to Endeavour to Evince their
SALT, SULPHUR
AND
MERCURY,
TO BE

The True Principles of Things.

To which in this Edition are subjoyn'd divers
Experiments and Notes about the *Produci-
bleness of Chymical Principles.*

&

OXFORD,
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A
P R E F A C E
I N T R O D U C T O R Y

To the following Treatise.



To give the Reader an account, Why the following Treatise is suffer'd to pass abroad so maim'd and imperfect, I must inform him that 'tis now long since, that to gratify an ingenious Gentleman, I set down some of the Reasons that kept me from fully acquiescing either in the Peripatetical, or in the Chymical Doctrine, of the Material Principles of mixt Bodies. This Discourse some years after falling into the hands of some learned men, had the good luck to be so favourably receiv'd' and advantageously spoken of by them, that having had more than ordinary Invitations given me to make it publick, I thought fit to review it, that I might retrench some things that seem'd not so fit to be shewn to every Reader, And substitute some of those other things that occur'd to me of

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the tryalls and observations I had since made: What became of my papers, I elsewhere mention in a Preface where I complain of it: But since I writ That, I found many sheets that belong'd to the subjects I am now about to discourse of. Wherefore seeing that I had then in my hands as much of the first Dialogue as was requisite to state the Case, and serve for an Introduction as well to the conference betwixt Carnades and E-leutherius, as to some other Dialogues, which for certain reasons are not herewith publish'd, I resolv'd to supply, as well as I could, the Contents of a Paper belonging to the second of the following Discourses, which I could not possibly retrieve, though it were the chief of them all. And having once more try'd the Opinion of Friends, but not the same, about this imperfect work, I found it such, that I was content in compliance with their Desires, that not only it should be publish'd, but that it should be publish'd as soon as conveniently might be. I had indeed all along the Dialogues spoken of my self, as of a third Person; For they containing Discourses which were among the first Treatises that I ventur'd long ago to write of matters Philosophical, I had reason to desire, with the Painter, to latere pone tabulam, and hear what men would say of them, before I own'd my self to be their Author. But besides that now I find, 'tis not unknown to many who it is
that

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that writ them, I am made to believe that 'tis not inexpedient, they should be known to come from a Person altogether a stranger to Chymical Affairs. And I made the less scruple to let them come abroad uncompleated, partly, because my affairs and Pre-ingagements to publish divers other Treatises allow'd me small hopes of being able in a great while to compleat those Dialogues. And partly because I am not unapt to think, that they may come abroad seasonably enough, though not for the Authors reputation, yet for other purposes. For I observe, that of late Chymistry begins, as indeed it deserves, to be cultivated by Learned Men who before despis'd it; and to be pretended to by many who never cultivated it, that they may be thought not to be ignorant of it: Whence it is come to passe, that divers Chymical Notions about Matters Philosophicall are taken for granted and employ'd, and so adopted by very eminent Writers both Naturalists and Physitians. Now this I fear may prove somewhat prejudicial to the Advancement of solid Philosophy: For though I am a great Lover of Chymical Experiments, and though I have no mean esteem of divers Chymical Remedies, yet I distinguish these from their Notions about the causes of things and their manner of Generation. And for ought I can hitherto discern, there are a thousand Phænomena in Nature, besides a

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Multitude of Accidents relating to the humane Body, which will scarcely be clearly and satisfactorily made out by them that confine themselves to deduce things from Salt, Sulphur and Mercury, and the other Notions peculiar to the Chymists, without taking much more Notice than they are wont to do, of the Motions and Figures, of the small parts of Matter, and the other more Catholick and Fruitful affections of Bodies. Wherefore it will not perhaps be now unseasonable to let our Carneades warne Men, not to subscribe to the grand Doctrine of the Chymists touching their three Hypostatical Principles, till they have a little examin'd it, and consider'd, how they can clear it from his objections, divers of which 'tis like they may never have thought on; since a Chymist scarce would, and none but a Chymist could propose them. I hope also it will not be unacceptable to several Ingenious Persons, who are unwilling to determine of any important Controversie, without a previous consideration of what may be said on both sides, and yet have greater desires to understand Chymical Matters, than opportunities of learning them, to find here together, besides several Experiments of my own purposely made to Illustrate the Doctrine of the Elements, divers others scarce to be met with, otherwise then Scatter'd among many Chymical Books: And to Find these Associated

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ciated Experiments so Deliver'd as that an Ordinary Reader, if he be but acquainted with the usual Chymical Termes, may easily enough understand them; and even a wary One may safely rely on Them. These Things I add, because a person any Thing vers'd in the Writings of Chymists cannot but Discern by their obscure, ambiguous, and almost Ænigmatical Way of expressing what they pretend to Teach, that they have no Mind to be understood at all, but by the Sons of Art (as they call them) nor to be Understood even by these without Difficulty and Hazardous Tryalls. Insomuch that some of Them Scarce ever speak so candidly, as when they make use of that known Chymical Sentence; *Ubi palam locuti sumus, ibi nihil diximus.* And as the obscurity of what some Writers deliver makes it very difficult to be understood; so the Unfaithfulness of too many others makes it unfit to be reli'd on. For though unwillingly, Yet I must for the truth sake, and the Readers, warne him not to be forward to believe Chymical Experiments when they are set down only by way of Prescriptions, and not of Relations; that is, unless he that delivers them mentions his doing it upon his own particular knowledge, or upon the Relation of some credible person, avowing it upon his own experience. For I

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am troubled, I must complain, that even Eminent Writers, both Physitians and Philosophers, whom I can easily name, if it be requir'd, have of late suffer'd themselves to be so far impos'd upon, as to Publish and Build upon Chymical Experiments, which questionless they never try'd; for if they had, they would, as well as I, have found them not to be true. And indeed it were to be wish'd, that now that those begin to quote Chymical Experiments that are not themselves Acquainted with Chymical Operations, men would Leave off that Indefinite Way of Vouching the Chymists say this, or the Chymists affirme that, and would rather for each Experiment they alledge name the Author or Authors, upon whose credit they relate it; For, by this means they would secure themselves from the suspicion of falshood (to which the other Practice Exposeth them) and they would leave the Reader to Judge of what is fit for him to Believe of what is Delivered, whilst they employ not their own great names to Countenance doubtfull Relations; and they will also do Justice to the Inventors or Publishers of the true Experiments, as well as upon the Obtruders of false ones. Whereas by that general Way of quoting the Chymists, the candid Writer is Defrauded of the particular Praise, and the impostor escapes the Personal Disgrace that is due to him.

The

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The remaining Part of this Preface must be imploy'd in saying something for Carneades, and something for my Selfe.

And first, Carneades hopes that he will be thought to have disputed civilly and Modestly enough for one that was to play the Antagonist and the Sceptick. And if he any where seem to slight his Adversaries Tenents and Arguments, he is willing to have it look'd upon as what he was induc'd to, not so much by his Opinion of them, as the Examples of Themistius and Philoponus, and the custom of such kind of Disputes.

*Next, In case that some of his Arguments shall not be thought of the most Cogent sort that may be, he hopes it will be consider'd that it ought not to be Expected, that they should be So. For, his part being chiefly, but to propose Doubts and Scruples, he does enough, if he shews that his Adversaries Arguments are not Strongly Concluding, though his own be not so neither. And if there should appear any disagreement betwixt the things he delivers in divers passages, he hopes it will be considered, that it is not necessary that all the things a Sceptick Proposes, should be consonant; since it being his work to Suggest doubts against the Opinion he questions, it is allowable for him to propose two or more several Hypotheses about the same thing: And to
say*

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Say that it may be accounted for this way, or that way, or the other Way, though these wayes be perhaps inconsistent among themselves. Because it is enough for him, if either of the proposed Hypotheses be but as probable as that he calls in question. And if he propose many that are Each of them probable, he do's the more ratify his doubts, by making it appear the more difficult to be sure, that that way which they all differ from is the true. And our Carneades by holding the Negative, has this advantage, that if among all the Instances he brings to invalidate the Vulgar Doctrine of those he Disputes with, any one be Irrefragable, that alone is sufficient to overthrow a Doctrine which Universally asserts what he opposes. For it cannot be true, that all Bodies whatsoever that are reckon'd among the Perfectly mixt Ones, are compounded of such a Determinate Number of such or such Ingredients, in case any one such Body can be produc'd, that is not so compounded; and he hopes too, that Accuracy will be the less expected from him, because his undertaking obliges him to maintain such Opinions in Chymistry, and that chiefly by Chymicall Arguments, as are Contrary to the very Principles of the Chymists, From whose writings it is not Therefore like he should receive any intentional Assistance, except from some Passages of the Bold and Ingenious Helmont,

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mont, with whom he yet disagrees in many things (which reduce him to explicate Divers Chymical Phænomena, according to other Notions;) And of whose Ratiocinations, not only some seem very Extravagant, but even the Rest are not wont to be as considerable as his Experiments. And though it be True indeed, that some Aristotelians have occasionally written against the Chymical Doctrine he Oppugnes, yet since they have done it according to their Principles, And since our Carneades must as well oppose their Hypothesis as that of the Spagyrist, he was fain to fight his Adversaries with his own Weapons, Those of the Peripatetick being Improper if not hurtfull for a Person of his Tenents; besides that those Aristotelians, (at Least those he met with,) that have written against the Chymists, seem to have had so little Experimental Knowledge in Chymical Matters, that by their frequent Mistakes and unskilfull way of Oppugning, they have too often expos'd themselves to the Derision of their adversaries, for writing so Confidently against what they appeare so little to understand.

And Lastly, Carneades hopes, he shall do the Ingenious this Piece of service, that by having Thus drawn the Chymists Doctrine out of their Dark and Smokie Laboratories, and both brought it into the open light, and shewn the weakness

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ness of their Proofs, that have hitherto been wont to be brought for it, either Judicious Men shall henceforth be allowed calmly and after due information to disbelieve it, or those abler Chymists, that are zealous for the reputation of it, will be obliged to speak plainer than hitherto has been done, and maintain it by better Experiments and Arguments than those Carneades hath examin'd : so That he hopes the Curious will one Way or other Derive either satisfaction or instruction from his endeavours. And as he is ready to make good the profession he makes in the close of his Discourse, of being ready to be better inform'd, so he expects either to be indeed inform'd, or to be let alone. Forthough, if any Truly knowing Chymists shall Think fit in a civill and rationall way to shew him any truth touching the matter in Dispute That he yet discernes not, Carneades will not refuse either to admit, or to own a conviction: yet if any impertinent Person shall, either to get Himselfe a Name, or for what other end soever, wilfully or carelessly mistake the State of the controversie, or the sense of his Arguments, or shall rail instead of arguing, as hath been done of Late in Print by G. and F. and H. and others, in their books divers Chymists; or lastly, against one another. shall write against them in a canting way, I mean shall express himselfe in ambiguous or obscure termes, or argue from Experiments not intelligibly enough Deliver'd, Carneades professes, That he values his
his

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his time so much, as not to think the answering such Trifles worth the loss of it.

And now having said thus much for Carneades, I hope the Reader will give me leave to say something for my self.

And first, if some morose Readers shall find fault with my having made the Interlocutors upon occasion complement with one another, and that I have almost all along written these Dialogues in a stile more Fashionable than That of meer Scholars is wont to be, I hope I shall be excus'd by them that shall consider, that to keep a due decorum in the Discourses, it was fit that in a book written by a Gentleman, and wherein only Gentlemen are introduc'd as speakers, the Language should be more smooth and the Expressions more Civil than is usual in the more Scholastick way of writing. And indeed, I am not sorry to have this Opportunity of giving an example how to manage even Disputes with Civility; whence perhaps some Readers will be assisted to discern a Difference betwixt Bluntness of Speech and Strength of reason, and find that a man may be a Champion for Truth, without being an Enemy to Civility; and may confute an Opinion without railing at Them that hold it; To whom he that desires to convince and not to provoke them, must make some amends by his Civility.

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vility to their Persons, for his severity to their mistakes; and must say as little else as he can, to displease them, when he saies that they are in an error.

But perhaps other Readers will be less apt to find fault with the Civility of my Disputants, than the Chymists will be, upon the reading of some Passages of the following Dialogue, to accuse Carneades of Asperity. But if I have made my Sceptick sometimes speak sleightingly of the Opinions he opposes, I hope it will not be found that I have done any more, than became the Part he was to act of an Opponent: especially, if what I have made him say be compar'd with what the Prince of the Romane Orators himself makes both great Persons and Friends say of one anothers Opinions, in his excellent Dialogues, *De Natura Deorum*: And I shall scarce be suspected of Partiality, in the case, by them that take Notice that there is full as much (if not far more) liberty of sleighting their Adversaries Tenents to be met with in the Discourses of those with whom Carneades disputes. Nor need I make the Interlocutors speak otherwise than freely in a Dialogue, wherein it was sufficiently intimated, that I meant not to declare my own Opinion of the Arguments propos'd, much lesse of the whole Controversy it selfe, otherwise than as it may by an attentive Reader be guess'd at by some Passages of Carneades: (I say, some

*The Dialogues here meanr are those about Heat, Fire, Flame &c. (seen by two Secretaries of the Royal Society) that the Author somewhere complains to have been missing vvith o. her things of his presently after the hasty removal of his Goods by Night in the great fire of London.

Passages, because I make not all that he saies, especially in the heat of Disputation, mine,) partly in this Discourse, and partly in some other * Dialogues betwixt the same Speakers immediately of the Elements) which have long layn

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layn by me, and expect the Entertainment that these present Discourses will meet with. And indeed they will much mistake me, that shall conclude from what I now publish, that I am at Defiance with Chymistry, or would make my Readers so. I hope the Specimina I have lately publish'd of an attempt to shew the usefulness of Chymical Experiments to Contemplative Philosophers, will give those that read them other thoughts of me, and I had a design (but wanted opportunity) to publish with these Papers an Essay I have lying by me, the greater part of which is Apologetical for one sort of Chymists. And at least, as for those that know me, I hope the pain I have taken in the fire will both convince them, that I am far from being an Enemy to the Chymists Art, (though I am no friend to many that disgrace it by professing it,) and persuade them to believe me when I declare that I distinguish betwixt those Chymists that are either Cheats, or but Laborants, and the true Adepti; By whome could I enjoy there conversation, I would both willingly and thankfully be instructed; especially concerning the Nature and Generation of Metals: And possibly, those that know how little I have remitted of my former addictedness to make Chymical Experiments, will easily believe, that one of the chief Designes of this Sceptical Discourse was, not so much to discredit Chymistry, as to give an occasion and a kind of necessity to the more knowing Artists to lay aside a little of their over-great Reservedness, and either explicate or prove the Chymicall Theory better than ordinary Chymists have done, or by enriching us with some of their nobler secrets

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crets to evince that Their art is able to make amends even for the deficiencies of their Theory: And thus much I shall make bold to add, that we shall much undervalue Chymistry, if we imagine, that it cannot teach us things farr more useful, not only to Physick but to Philosophy, than those that are hitherto known to vulgar Chymists. And yet as for inferior Spagirists themselves, they have by their labours deserv'd so well of the common Wealth of Learning, that methinks 'tis Pity they should ever misse the Truth which they have so industriously sought. And though I be no Admirer of the Theorical Part of their Art, yet my conjectures will much deceive me, if the Practical Part be not hereafter much more cultivated than hitherto it has been, and do not both employ Philosophy and Philosophers, and hope to make Men such. Nor would I, that have been diverted by other Studies as well as affairs, be thought to pretend being a profound Spagyrist, by finding so many faults in the Doctrine wherein the generality of Chymists scruples not to Acquiesce: For besides that 'tis most commonly far easier to frame Objections against any propos'd Hypothesis, than to propose an Hypothesis not lyable to Objections (besides this I say) 'tis no such great matter, if whereas Beginners in Chymistry are commonly at once imbu'd with the Theory and Operations of their profession, I who had the good fortune to Learn the Operations from illiterate Persons, upon whose credit I was not Tempted to take up any opinion about them, should consider things with lesse prejudice, and consequently

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sequently with other Eyes than the Generality of Learners; And should be more dispos'd to accommodate the Phænomena that occur'd to me to other Notions than to those of the Spagirists. And having at first entertain'd a suspicion That the Vulgar Principles were lesse General and comprehensive, or lesse considerately Deduc'd from Chymical Operations, than was beleiv'd, it was not uneasie for me both to Take notice of divers Phænomena, overlook'd by prepossess'd Persons, that seem'd not to suite so well with the Hermetical Doctrine; and to devise some Experiments likely to furnish me with Objections against it, not known to many, that having practis'd Chymistry longer perchance than I have yet liv'd, may have far more Experience, Than I, of particular processes.

To conclude, whether the Notions I have propos'd, and the Experiments I have communicated, be considerable, or not, I willingly leave others to Judge; and this only I shall say for my Self, That I have endeavour'd to deliver matters of Fact, so faithfully, that I may as well assist the lesse skilful Readers to examine the Chymical Hypothesis, as provoke the Spagirical Philosophers to illustrate it: which if they do, and that either the Chymical opinion, or the Peripatetick, or any other Theory of the Elements
a . differing

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differing from that I am most inclin'd to, shall be intelligibly explicated, and duly prov'd to me; what I have hitherto discours'd will not hinder it from making a Profelyte of a Person that Loves Fluctuation of Judgment little enough to be willing to be eas'd of it by any thing but Error.

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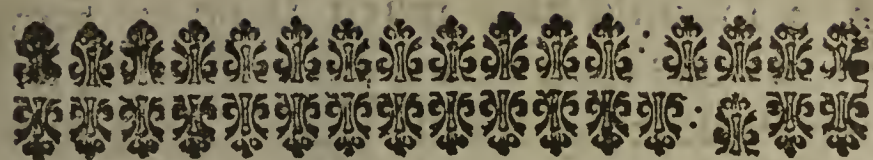
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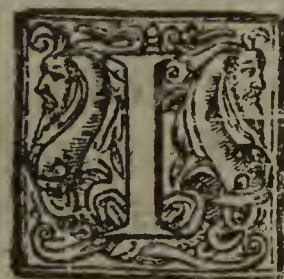


PHYSIOLOGICAL
CONSIDERATIONS

Touching

*The experiments wont to be employed
to evince either the IV Peripatetick
Elements, or the III Chymical Prin-
ciples of Mixt Bodies.*

Part of the First Dialogue.



Perceive that divers of
my Friends have thought
it very strange to hear
me speak so irresolved-
ly, as I have been wont
to do, concerning those things
which some take to be the Elements,
and others to be the Principles of all
mixt Bodies. But I blush not to ac-
knowledge that I much less scruple to
confess that I Doubt, when I do so, than

B

to

to profess that I Know what I do not :
 And I should have much stronger Ex-
 pectations than I dare yet entertain, to
 see Philosophy solidly establish'd, if men
 would more carefully distinguish those
 things that they know, from those that
 they ignore or do but think, and then
 explicate clearly the things they con-
 ceive they understand, acknowledge in-
 genuously what it is they ignore, and
 profess so candidly their Doubts, that
 the industry of intelligent persons
 might be set on work to make further
 enquiries, & the easiness of less discer-
 ning Men might not be impos'd on.
 But because a more particular accompt
 will probably be expected of my unsa-
 tisfyedness not only with the Peripa-
 tetick, but with the Chymical Doctrine
 of the Primitive Ingredients of Bodies:
 It may possibly serve to satisfy others
 of the excusableness of my dissatisfac-
 tion to peruse the ensuing Relation of
 what passed a while since at a meeting
 of persons of several opinions, in a
 place that need not here be named;
 where the subject, whereof we have
 been speaking, was amply and various-
 ly discours'd of.

It was on one of the fairest dayes of this Summer that the inquisitive *Eleutherius* came to invite me to make a visit with him to his friend *Carneades*. I readily consented to this motion, telling him that if he would but permit me to go first and make an excuse at a place not far off, where I had at that hour appointed to meet, but not about a business either of moment, or that could not well admit of a delay, I would presently wait on him, because of my knowing *Carneades* to be so conversant with nature and with Furnaces, and so unconfin'd to vulgar Opinions, that he would probably by some ingenious Paradox or other, give our mindes at least a pleasing Exercise, and perhaps enrich them with some solid instruction. *Eleutherius* then first going with me to the place where my Apology was to be made, I accompanied him to the lodging of *Carneades*, where when we were come, we were told by the Servants, that he was retired with a couple of Friends (whose names they also told us) to one of the Arbours in his Garden, to enjoy under its coole shades a delightful protection from the yet troublesome heat of the Sun.

Eleutherius being perfectly acquainted with that Garden immediately led me to the Arbour, and relying on the intimate familiarity that had been long cherish'd betwixt him and *Carneades*; in spite of my Reluctancy to what might look like an intrusion upon his privacy, drawing me by the hand, he abruptly entered the Arbour, where we found *Carneades*, *Philoponus*, and *Themistius*, sitting close about a little round Table, on which, besides paper, pen, and inke, there lay two or three open Books; *Carneades* appeared not at all troubled at this surprise, but rising from the Table, received his Friend with open looks and armes, and welcoming me also with his wonted freedom and civility, invited us to rest our selves by him, which, as soon as we had exchanged with his two Friends (who were ours also) the civilities accustomed on such occasions, we did. And he presently after we had seated our selves, shutting the Books that lay open, and turning to us with a smiling countenance, seemed ready to begin some such unconcerning discourse as is wont to pass, or rather wast the time in promiscuous companies.

But

But *Eleutherius* guessing at what he meant to do, prevented him by telling him, I perceive *Carneades* by the books that you have been now shutting, and much more by the posture wherein I found Persons so qualify'd to discourse of serious matters, and so accusom'd to do it, that you three were, before our coming, engag'd in some Philosophical conference, which I hope you will either prosecute, and allow us to be partakers of, in recompence of the freedom we have us'd in presuming to surprise you, or else give us leave to repair the injury we should otherwise do you, by leaving you to the freedom we have interrupted, and punishing ourselves for our boldness by depriving ourselves of the happiness of your company. With these last words he and I rose up, as if we meant to be gone: But *Carneades* suddenly laying hold on his arme, and stopping him by it, smilingly told him, We are not so forward to lose good company as you seem to imagine; especially since you are pleas'd to desire to be present at what we shall say, about such a Subject as that You found us considering. For that, being

the number of the Elements, Principles, or Materiall Ingredients of Bodies, is an enquiry whose truth is of that Importance, and of that Difficulty, that it may as well deserve, as require, to be searched into by such skilfull Indagators of Nature, as your selves. And therefore we sent to invite the bold and acute *Leucippus* to lend us some light by his Atomical Paradox, upon which we expected such pregnant hints, that 'twas not without a great deal of trouble that we had lately word brought us that he was not to be found; & we had likewise begg'd the Assistance of your presence and thoughts, had not the messenger we employ'd to *Leucippus* inform'd us that as he was going, he saw you both pass by towards another part of the Town; And this frustrated expectation of *Leucippus* his company, who told me but last night that he would be ready to give me a meeting where I pleas'd to day, having very long suspended our conference about the freshly mention'd Subject, it was so newly begun when you came in, that we shall scarce need to repeat any thing to acquaint you with what had pass'd betwixt us before

your

your arrival, so that I cannot but look upon it as a fortunate Accident that you should come so seasonably, to be not hearers alone, but we hope Interlocutors at our conference. For we shall not only allow of your presence at it, but desire your Assistance in it; which I add both for other reasons, and because though these learned Gentlemen (saies he, turning to his two friends) need not fear to discourse before any Auditory, provided it be intelligent enough to understand them, yet for my part (continues he with a new smile,) I shall not dare to vent my unpremeditated thoughts before two such Criticks, unless by promising to take your turnes of speaking; You will allow me mine of quarrelling, with what has been said. He and his friends added divers things to convince us that they were both desirous that we should hear them, and resolved against our doing so, unless we allowed them sometimes to hear us. *Elutherius*, after having a while fruitlessly endeavoured to obtain leave to be silent, promis'd he would not be so alwayes, provided that he were permitted according to the freedom of his

Genius and Principles to side with one of them in the managing of one Argument, and, if he saw cause, with his Antagonist, in the Prosecution of another, without being confin'd to stick to any one party or opinion, which was after some debate accorded him. But I, conscious to my own Disability's, told them resolutely that I was as much more willing, as more fit, to be a hearer than a speaker, among such knowing Persons, and on so abstruse a Subject. And that therefore I beseeched them without necessitating me to proclaim my weaknesses, to allow me to lessen them by being a silent Auditor of their Discourses: to suffer me to be at which I could present them no motive, save that their instructions would make them in me a more intelligent Admirer. I added, that I desir'd not to be idle whilst they were employ'd, but would if they pleas'd, by writing down in short hand what should be delivered, preserve Discourses that I knew would merit to be lasting. At first *Carneades* and his two friends utterly rejected this motion; and all that my Resoluteness to make use of my ears, not
tongue

tongue at their debates, could do, was to make them acquiesce in the Proposition of *Eleutherius*, who thinking himself concern'd, because he brought me thither, to afford me some faint assistance, was content that I should register their Arguments, that I might be the better able after the conclusion of their conference to give them my sense upon the Subject of it, (The number of Elements or Principles) which he promis'd I should do at the end of the present Debates, if time would permit, or else at our next meeting. And this being by him undertaken in my name, though without my consent, the company would by no means receive my Protestation against it, but casting, all at once, their eyes on *Carneades*, they did by that and their unanimous silence, invite him to begin; which (after a short pause, during which he turn'd himself to *Eleutherius* and me) he did in this manner.

Notwithstanding the subtle reasonings I have met with in the books of the Peripateticks, and the pretty experiments that have been shew'd me in the Laboratories of Chymists, I am of so diffident

diffident, or dull a Nature ; as to think that if neither of them can bring more cogent arguments to evince the truth of their assertion than are wont to be brought ; a Man may rationally enough retain some doubts concerning the very number of those materiall Ingredients of mixt bodies, which some would have us call Elements, and others Principles. Indeed when I considered, that the Tenets concerning the Elements, are as considerable amongst the Doctrines of natural Philosophy, as the Elements themselves are among the bodies of the Universe, I expected to find those Opinions solidly establish'd, upon which so many others are superstructed. But when I took the pains impartially to examine the bodies themselves that are said to result from the blended Elements, and to torture them into a confession of their constituent Principles, I was quickly induc'd to think that the number of the Elements has been contended about by Philosophers with more earnestness, than success. This unsatisfiedness of mine has been much wonder'd at, by these two Gentlemen (at which words he pointed at *Themisti-*

us and *Philoponus*) who though they differ almost as much betwixt themselves about the question we are to consider, as I do from either of them, yet they both agree very well in this, that there is a determinate number of such ingredients as I was just now speaking of, and that what that number is, I say not, may be (for what may not such as they perswade?) but is wont to be clearly enough demonstrated both by Reason and Experience. This has occasion'd our present Conference. For our Discourse this afternoon, having fallen from one subject to another, and at length sett'd on this, they proffer'd to demonstrate to me, each of them the truth of his opinion, out of both the Topicks that I have freshly nam'd. But on the former (that of Reason strictly so taken) we declin'd insisting at the present, lest we should not have time enough before supper to go through the Reasons and Experiments too. The latter of which we unanimously thought the most requisite to be seriously examin'd. I must desire you then to take notice Gentlemen (continued *Carneades*) that my present business doth not ob-

oblige me so to declare my own opinion on the Subject in question, as to assert or deny the truth either of the Peripatetick, or the Chymical Doctrine concerning the number of the Elements, but only to shew you that neither of these Doctrines hath been satisfactorily proved by the arguments commonly alledged on its behalfe. So that if I really discern (as perhaps I think I do) that there may be a more rational account than ordinary, given of one of these opinions, I am left free to declare my self of it, notwithstanding my present engagement, it being obvious to all your observation, that a solid truth may be generally maintained by no other, than incompetent Arguments. And to this Declaration I hope it will be needless to add, that my task obliges me not to answer the Arguments that may be drawn either for *Themistius* or *Philoponus*'s Opinion from the Topick of reason, as opposed to experiments; since 'tis these only that I am to examine, and not all these neither, but such of them alone, as either of them shall think fit to insist on, and as have hitherto been wont to be brought either to prove that 'tis the

the four Peripatetick Elements, or that 'tis the three Chymical Principles that all compounded bodies consist of. These things (adds *Carneades*) I thought my self obliged to premise ; partly lest you should do these Gentlemen (pointing at *Themistius* and *Philoponus*, and smiling on them) the injury of measuring their parts by the arguments they are ready to propose, the lawes of our Conference confining them to make use of those that the vulgar of Philosophers (for even of them there is a vulgar) has drawn up to their hands; and partly, that you should not condemn me of presumption for disputing against persons over whom I can hope for no advantage, that I must not derive from the nature, or rules of our controversy, wherein I have but a negative to defend, and wherein too I am like on several occasions to have the Assistance of one of my disagreeing adversaries against the other.

Philoponus and *Themistius* soon returned this complement with civilities of the like nature, in which *Eleutherius* perceiving them engaged, to prevent the further loss of that time of which they were not like to have very much to spare,
he

he minded them that their present business was not to exchange complements, but Arguments: and then addressing his speech to *Carneades*, I esteem it no small happiness (saies he) that I am come here so luckily this Evening. For I have been long disquieted with Doubts concerning this very subject which you are now ready to debate. And since a Question of this importance is to be now discussed by persons that maintain such variety of opinions concerning it, & are both so able to enquire after truth, and so ready to embrace it by whomsoever and on what occasion soever it is presented them; I cannot but promise my self that I shall, before we part, either lose my Doubts or the hopes of ever finding them resolved: *Eleutherius* paused not here; but to prevent their answer, added almost in the same breath; and I am not a little pleased to find that you are resolved on this occasion to insist rather on Experiments than Syllogismes. For I, and no doubt You, have long observed, that those Dialectical subtleties, that the Schoolmen too often employ about Physiological Mysteries, are wont much more to declare the wit of him
that

that uses them, than increase the knowledge or remove the doubts of sober lovers of truth. And such captious subtleties do indeed often puzzle & sometimes silence men, but rarely satisfy them. Being like the tricks of Jugglers, whereby men doubt not but they are cheated, though oftentimes they cannot declare by what flights they are imposed on. And therefore I think you have done very wisely to make it your business to consider the *Phænomena* relating to the present Question, which have been afforded by experiments, especially since it might seem injurious to our senses by whose mediation we acquire so much of the knowledge we have of things corporal, to have recourse to far-fetched & abstracted Ratiocinations, to know what are the sensible ingredients of those sensible things that we daily see and handle, and are supposed to have the liberty to untwist (if I may so speak) into the primitive bodies they consist of. He annexed that he wished therefore they would no longer delay his expected satisfaction, if they had not, as he feared they had, forgotten something preparatory to their debate; and that was to lay

lay down what should be all along understood by the word Principle or Element. *Carneades* thank'd him for his admonition; but told him that they had not been unmindful of so requisite a thing. But that being Gentlemen & very far from the litigious humour of loving to wrangle about words, or terms, or notions as empty; they had before his coming in, readily agreed promiscuously to use when they pleased, Elements and Principles as terms equivalent: and to understand both by the one and the other, those primitive and simple Bodies of which the mixt ones are said to be composed; and into which they are ultimately resolved. And upon the same account (he added) we agreed to discourse of the opinions to be debated, as we have found them maintained by the Generality of the assertors of the four Elements of the one party, and of those that receive the three Principles on the other; without tying our selves to enquire scrupulously what notion either *Aristotle* or *Paracelsus*, or this or that Interpreter, or follower of either of those great persons, framed of Elements or Principles; our design being to examine, not what these

these or those writers thought or taught; but what we find to be the obvious & most general opinion of those, who are willing to be accounted Favourers of the Peripatetick or Chymical Doctrine, concerning this subject.

I see not (saies *Eleutherius*) why you might not immediately begin to argue, if you were but agreed which of your two friendly Adversaries shall be first heard. And it being quickly resolv'd on that *Themistius* should first propose the Proofs for his Opinion, because it was the antienter, and the more general, he made not the company expect long before he thus address'd himself to *Eleutherius*; as to the Person least interested in the dispute.

If you have taken sufficient notice of the late Confession which was made by *Carneades*, and which (though his Civility dress'd it up in complementall Expressions) was exacted of him by his Justice, I suppose You will be easily made sensible, that I engage in this Controversie with great and peculiar Disadvantages, besides those which his Parts and my Personal Disabilities would bring to any other cause to be

maintained by me against him. For he justly apprehending the force of truth, though speaking by no better a tongue than mine, has made it the chief condition of our Duell, that I should lay aside the best Weapons I have, and those I can best handle; Whereas if I were allowed the freedom, in pleading for the four Elements, to employ the Arguments suggested to me by Reason to demonstrate them, I should almost as little doubt of making You a Profelyte to those unsever'd Teachers, Truth and *Aristotle*, as I do of your Candour & your Judgment. And I hope you will however consider, that that great Favorite and Interpreter of Nature, *Aristotle*, who was (as his *Organum* witnesses) the greatest Master of Logick that ever liv'd, disclaim'd the course taken by other petty Philosophers (Antient and Modern) who not attending the Coherence and Consequences of their Opinions, are more solicitous to make each particular Opinion plausible independently upon the rest, than to frame them all so, as not only to be consistent together, but to support each other. For that great
Man

Man in his vast and comprehensive Intellect, so fram'd each of his Notions, that being curiously adapted into one Systeme, they need not each of them any other defence than that which their mutuall Coherence gives them: As 'tis in an Arch, where each single stone, which if sever'd from the rest would be perhaps defenceless, is sufficiently secur'd by the solidity and entireness of the whole Fabrick of which it is a part. How justly this may be apply'd to the present case, I could easily shew You, if I were permitted to declare to You, how harmonious *Aristotles* Doctrine of the Elements is with his other Principles of Philosophy; and how rationally he has deduc'd their number from that of the combinations of the four first Qualities from the kinds of simple Motion belonging to simple bodies, and from I know not how many other Principles and *Phænomena* of Nature, which so conspire with his Doctrine of the Elements, that they mutually strengthen and support each other. But since 'tis forbidden me to insist on Reflections of this kind, I must proceed to tell You, that though the

Assertors of the four Elements value Reason so highly, and are furnish'd with Arguments enough drawn from thence, to be satisfi'd that there must be four Elements, though no man had ever yet made any sensible tryal to discover their Number, yet they are not destitute of Experience to satisfie others that are wont to be more sway'd by their senses than their Reason. And I shall proceed to consider the testimony of Experience, when I shall have first advertis'd You, that if Men were as perfectly rational, as 'tis to be wish'd they were, this sensible way of Probation would be as needless as 'tis wont to be imperfect. For it is much more high and Philosophical to discover things *a priore*, than *a posteriore*. And therefore the Peripateticks have not been very solicitous to gather Experiments to prove their Doctrines, contenting themselves with a few only, to satisfie those that are not capable of a Nobler Conviction. And indeed they employ Experiments rather to illustrate than to demonstrate their Doctrines, as Astronomers use Sphaeres of pasteboard, to descend to the capacities

ties of such as must be taught by their senses, for want of being arriv'd to a clear apprehension of purely Mathematical Notions and Truths. I speak thus *Eleutherius* (adds *Themistius*) only to do right to Reason, and not out of Diffidence of the Experimental proof I am to alledge. For though I shall name but one, yet it is such a one as will make all other appear as needless as it self will be found Satisfactory. For if you but consider a piece of green Wood burning in a Chimney, You will readily discern in the disbanded parts of it the four Elements, of which we teach it and other mixt bodies to be compos'd. The fire discovers it self in the flame by its own light; the smoake by ascending to the top of the chimney, and there readily vanishing into air, like a River losing it self in the Sea, sufficiently manifests to what Element it belongs and gladly returns. The water in its own form boyling and hissing at the ends of the burning Wood betrays it self to more than one of our senses; and the ashes by their weight, their fineness, & their dryness, put it past doubt that they belong to the Element

of Earth. If I spoke (continues *The-
mistius*) to less knowing Persons, I
would perhaps make some Excuse for
building upon such an obvious and easie
Analysis, but 'twould be, I fear, injurious,
not to think such an Apology needless
to You, who are too judicious either to
think it necessary that Experiments to
prove obvious truths should be farr
fetch'd, or to wonder that among so ma-
ny mixt Bodies that are compounded
of the four Elements, some of them
should upon a slight *Analysis* manifest-
ly exhibite the Ingredients they consist
of. Especially since it is very agreeable
to the Goodness of Nature, to disclose,
even in some of the most obvious Expe-
riments that men make, a Truth so
important and so requisite to be taken
notice of by them. Besides that our *A-
nalysis* by how much the more obvious
we make it, by so much the more suit-
able it will be to the Nature of that
Doctrine which 'tis alledged to prove,
which being as clear and intelligible to
the Understanding as obvious to the
sense, tis no marvel the learned part
of Mankind should so long and so ge-
nerally imbrace it. For this Doctrine
is

is very different from the whimsys of *Chymists* and other Modern Innovators, of whose *Hypotheses* we may observe, as Naturalists do of less perfect Animals, that as they are hastily form'd, so they are commonly short liv'd. For so these, as they are often fram'd in one week, are perhaps thought fit to be laughed at the next; and being built perchance but upon two or three Experiments are destroyed by a third or fourth, whereas the doctrine of the four Elements was fram'd by *Aristotle* after he had leasurely considered those Theories of former Philosophers which are now with great applause, revived as discovered by these latter ages; And had so judiciously detected and supplied the Errors and defects of former *Hypotheses* concerning the Elements, that his Doctrine of them has been ever since deservedly embraced by the letter'd part of Mankind: All the Philosophers that preceded him having in their several ages contributed to the compleateness of this Doctrine, as those of succeeding times have acquiesc'd in it. Nor has an *Hypothesis*, so deliberately and maturely established, been called in Questi-

on till in the last Century *Paracelsus* and some few other sooty Empiricks, rather than (as they are fain to call themselves) Philosophers, having their eyes darken'd, and their Braines troubl'd with the smoak of their own Furnaces, began to rail at the Peripatetick Doctrine, which they were too illiterate to understand, and to tell the credulous World, that they could see but three Ingredients in mixt Bodies; which to gain themselves the repute of Inventors, they endeavour'd to disguise by calling them, instead of Earth, and Fire, and Vapour, Salt, Sulphur, and Mercury; to which they gave the canting title of Hypostatical Principles. but when they came to describe them, they shew'd how little they understood what they meant by them, by disagreeing as much from one another, as from the truth they agreed in opposing: For they deliver their *Hypotheses* as darkly as their Processes; and 'tis almost as impossible for any sober Man to find their meaning, as 'tis for them to find their Elixir. And indeed nothing has spread their Philosophy, but their great Brags and undertakings; notwithstanding all which, (saies *Themisti-*

us smiling) I scarce know any thing they have performed worth wondering at, save that they have been able to draw *Philoponus* to their Party, and to engage him to the Defence of an unintelligible *Hypothesis*, who knowes so well as he does, that Principles ought to be like Diamonds, as well very clear, as perfectly solid.

Themistius having after these last words declared by his silence, that he had finished his Discourse, *Carneades* addressing himself, as his Adversary had done, to *Eleutherius*, returned this Answer to it. I hop'd for a Demonstration, but I perceive *Themistius* hopes to put me off with an Harangue, wherein he cannot have given me a greater Opinion of his Parts, than he has given me Distrust for his *Hypothesis*, since for it even a Man of such Learning can bring no better Arguments. The Rhetorical part of his Discourse, though it make not the least part of it, I shall say nothing to, designing to examine only the Argumentative part, and leaving it to *Philoponus* to answer those passages wherein either *Paracelsus* or *Chymists* are concern'd: I shall observe to You, that in what he has said besides

besides, he makes it his Business to do these two things. The one to propose and make out an Experiment to demonstrate the common Opinion about the four Elements; And the other, to insinuate divers things which he thinks may repair the weakness of his Argument, from Experience, and upon other Accounts bring some credit to the otherwise defenceless Doctrine he maintains.

To begin then with his Experiment of the burning Wood, it seems to me to be obnoxious to not a few considerable Exceptions.

And first, if I would now deal rigidly with my Adversary, I might here make a great Question of the very way of Probation which he and others employ, without the least scruple, to evince, that the Bodies commonly call'd mixt, are made up of Earth, Air, Water, and Fire, which they are pleas'd also to call Elements; namely that upon the suppos'd *Analysis* made by the fire, of the former sort of *Concretes*, there are wont to emerge Bodies resembling those which they take for the Elements. For not to Anticipate here what I foresee I shall

shall have occasion to insist on, when I come to discourse with *Philoponus* concerning the right that fire has to pass for the proper and Universal Instrument of Analyzing mixt Bodies, not to Anticipate that, I say, if I were dispos'd to wrangle, I might alledge, that by *Themistius* his Experiment it would appear rather that those he calls Elements, are made of those he calls mixt Bodies, than mix'd Bodies of the Elements. For in *Themistius*'s Analyz'd Wood, and in other Bodies dissipated and alter'd by the fire, it appears, and he confesses, that which he takes for Elementary Fire and Water, are made out of the Concrete; but it appears not that the Concrete was made up of Fire and Water. Nor has either He, or any Man, for ought I know, of his perswasion, yet prov'd that nothing can be obtained from a Body by the fire that was not *Pre-existent* in it.

At this unexpected objection, not only *Themistius*, but the rest of the company appear'd not a little surpriz'd; but after a while *Philoponus* conceiving his opinion, as well as that of *Aristotle*, concern'd in that Objection, You cannot sure
(saies

(saies he to *Carneades*) propose this Difficulty, not to call it Cavill, otherwise than as an Exercise of wit, and not as laying any weight upon it. For how can that be separated from a thing that was not existent in it. When, for instance, a Refiner mingles Gold and Lead, and exposing this Mixture upon a Cuppell to the violence of the fire, thereby separates it into pure and refulgent Gold and Lead (which driven off together with the Dross of the Gold is thence call'd *Lythargyrium Auri*) can any man doubt that sees these two so differing substances separated from the Mass, that they were existent in it before it was committed to the fire.

I should (replies *Carneades*) allow your Argument to prove something, if, as Men see the Refiners commonly take before hand both Lead and Gold to make the Mass you speak of, so we did see Nature pull down a parcell of the Element of Fire, that is fancy'd to be plac'd I know not how many thousand Leagues off, contiguous to the Orb of the Moon, and to blend it with a quantity of each of the three other Elements, to compose every mixt Body, upon whose Resolution the
Fire

Fire presents us with Fire, and Earth; and the rest. And let me add, *Philoponus*, that to make your Reasoning cogent, it must be first prov'd, that the fire do's only take the Elementary Ingredients asunder, without otherwise altering them. For else 'tis obvious, that Bodies may afford substances which were not pre-existent in them; as Flesh too long kept produces Magots, and old Cheese Mites, which I suppose you will not affirm to be Ingredients of those Bodies. Now that fire do's not always barely separate the Elementary parts, but sometimes at least alter also the Ingredients of Bodies, if I did not expect ere long a better occasion to prove it, I might make probable out of your very Instance, wherein there is nothing Elementary separated by the great violence of the Refiners fire: the Gold and Lead which are the two Ingredients separated upon the *Analysis* being confessedly yet perfectly mixt Bodies, and the Litharge being Lead indeed; but such Lead as is differing in consistence and other Qualities from what it was before. To which I must add that I have sometimes seen, and so questionless have you much

much oftner, some parcells of Glasse adhering to the Test or Cuppel, and this Glass though Emergent as well as the Gold or Litharge upon your Analysis, you will not I hope allow to have been a third Ingredient of the Mass out of which the fire produc'd it.

Both *Philoponus* and *Themistius* were about to reply, when *Eleutherius* apprehending that the Prosecution of this Dispute would take up time, which might be better employ'd, thought fit to prevent them by saying to *Carneades*, You made at least half a Promise, when you first propos'd this Objection, that you would not (now at least) insist on it, nor indeed does it seem to be of absolute necessity to your cause, that you should. For though you should grant that there are Elements, it would not follow that there must be precisely four. And therefore I hope you will proceed to acquaint us with your other and more considerable Objections against *Themistius's* Opinion, especially since there is so great a Disproportion in Bulke betwixt the Earth, Water and Air, on the one part, and those little parcells of resembling substances, that the fire separates

rates from *Concretes* on the other part, that I can scarce think that you are serious, when to lose no advantage against your Adversary, you seem to deny it to be rational, to conclude these great simple Bodies to be the Elements, and not the Products of compounded ones.

What you alledge (replies *Carneades*) of the Vastness of the Earth and Water, has long since made me willing to allow them to be the greatest and chief Masses of Matter to be met with here below: But I think I could shew You, if You would give me leave, that this will prove only that the Elements, as You call them, are the chief Bodies that make up the neighbouring part of the World, but not that they are such Ingredients as every mixt Body must consist of. But since You challenge me of something of a Promise, though it be not an entire one, Yet I shall willingly performe it: And indeed I intended not, when I first mention'd this Objection, to insist on it at present against *Themistius*, (as I plainly intimated in my way of proposing it) being only desirous to lett you see, that though I discern'd my Advantages, yet

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I was willing to forego some of them rather than appear a rigid Adversary of a Cause so weak, that it may with safety be favourably dealt with. But I must here profess, and desire You to take Notice of it, that though I pass on to another Argument, it is not because I think this first invalid. For You will find in the Progress of our Dispute, that I had some reason to question the very way of Probation imploy'd both by Peripateticks and Chymists, to evince the being and number of the Elements. For that there are such, and that they are wont to be separated by the Analysis made by Fire, is indeed taken for granted by both Parties, but has not (for ought I know) been so much as plausibly attempted to be proved by either. Hoping then that when we come to that part of our Debate, wherein Considerations relating to this Matter are to be treated of, you will remember what I have now said, and that I do rather for a while suppose, than absolutely grant the truth of what I have question'd, I will proceed to another Objection.

And hereupon *Eleutherius* having pro-

promis'd him not to be unmindfull, when time should serve, of what he had declar'd.

I consider then (saies *Carneades*) in the next place, that there are divers Bodies out of which *Themistius* will not prove in haste, that there can be so many Elements as four extracted by the Fire. And I should perchance trouble him if I should ask him what Peripatetic can shew us, (I say not, all the four Elements, for that would be too rigid a Question, but) any one of them extracted out of Gold by any degree of Fire whatsoever. Nor is Gold the only Bodie in Nature that would puzzle an *Aristotelian*, (that is no more) to analyze by the Fire into Elementary Bodies, since, for ought I have yet observ'd both Silver and calcin'd *Venetian* Talck, and some other Concretes, not necessary here to be nam'd, are so fixt, that to reduce any of them into four Heterogeneous Substances has hitherto prov'd a Task much too hard. not only for the Disciples of *Aristotle*, but those of *Vulcan*, at least, whilst the latter have employ'd only Fire to make the *Analysis*.

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The next Argument (continues Carneades) that I shall urge against *Themistius's* Opinion shall be this, That as there are divers Bodies whose *Analysis* by Fire cannot reduce them into so many Heterogeneous Substances or Ingredients as four, so there are others which may be reduc'd into more, as the Blood (and divers other parts) of Men and other Animals, which yield when analyz'd five distinct Substances Phlegme, Spirit, Oyle, Salt and Earth, as Experience has shewn us in distilling Mans Blood, Harts-Horns, and divers other Bodies that belonging to the Animal-Kingdom abound with not uneasily sequestrable Salt.

The



THE
SCEPTICAL CHYMIST

The First Part.

I Am (saies *Carneades*) so unwilling to deny *Eleutherius* any thing, that though, before the rest of the Company I am resolv'd to make good the part I have undertaken of a Sceptick; yet I shall readily, since you will have it so, lay aside for a while the Person of an Adversary to the Peripateticks and Chymists; and before I acquaint you with my Objections against their Opinions, acknowledge to you what may be (whether truly or not) tolerably enough added, in favour of a certain number of Principles of mixt Bodies, to that grand and known Argument from the *Analysis*

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of

of compound Bodies, which I may possibly hereafter be able to confute.

And that you may the more easily Examine, and the better Judge of what I have to say, I shall cast it into a pretty number of distinct Propositions, to which I shall not premise any thing; because I take it for granted, that you need not be advertis'd, that much of what I am to deliver, whether for or against a determinate number of Ingredients of mixt Bodies, may be indifferently apply'd to the four Peripatetic Elements, and the three Chymical Principles, though divers of my Objections will more peculiarly belong to these last nam'd, because the Chymical *Hypothesis* seeming to be much more countenanc'd by Experience than the other, it will be expedient to insist chiefly upon the disproving of that; especially since most of the Arguments that are imploy'd against it, may, by a little variation, be made to conclude, at least as strongly against the less plausible, *Aristotelian* Doctrine.

To proceed then to my Propositions I shall begin with this, That

It seems not absurd to conceive that at the Propos. I.
first Production of mixt Bodies, the
Universal Matter whereof they among
other Parts of the Universe consisted,
was actually divided into little Particles
of several sizes and shapes variously
mov'd.

This (saies *Carpeades*) I suppose you will easily enough allow. For besides that which happens in the Generation, Corruption, Nutrition, and wasting of Bodies, that which we discover partly by our *Microscopes* of the extream littleness of even the scarce sensible parts of Concretes; and partly by the Chymical Resolutions of mixt Bodies, and by divers other Operations of Spagyricall Fires upon them, seems sufficiently to manifest their consisting of parts very minute and of differing Figures. And that there does also intervene a various local Motion of such small Bodies, will scarce be denied; whether we chuse to grant the Origine of Concretions assign'd by *Epicurus*, or that related by *Moses*. For the first, as you well know, supposes not only all

mixt Bodies, but all others to be produc'd by the various and casual occurrences of Atomes, moving themselves to and fro by an internal Principle in the Immense or rather Infinite *Vacuum*. And as for the inspir'd Historian, He, informing us that the great and Wise Author of Things did not immediately create Plants, Beasts, Birds, &c. but produc'd them out of those portions of the pre-existent, though created, Matter, that he calls Water and Earth, allows us to conceive, that the constituent Particles whereof these new Concretes were to consist, were variously moved in order to their being connected into the Bodies they were, by their various Coalitions and Textures, to compose.

But (continues *Carneades*) presuming that the first Proposition needs not be longer insisted on, I will pass on to the second, and tell you that

Propos.
II.

Neither is it possible that of these minute Particles divers of the smallest and neighbouring ones were here and there associated into minute Masses or Clusters, and did by their Coalitions constitute great store of such little primary Concretions

Concretions or Masses as were not easily dissipable into such Particles as compos'd them.

To what may be deduc'd, in favour of this Assertion from the Nature of the Thing it self, I will add something out of Experience, which though I have not known it used to such a purpose, seems to me more fairly to make out that there may be Elementary Bodies, than the more questionable Experiments of Peripateticks and Chymists prove that there are such. I consider then that Gold will mix and be colliquated not only with Silver, Copper, Tin and Lead, but with Antimony, *Regulus Martis* and many other Minerals, with which it will compose Bodies very differing both from Gold, and the other Ingredients of the resulting Concretes. And the same Gold will also by common *Aqua Regis*, and (I speak it knowingly) by divers other *Menstruums* be reduc'd into a seeming Liquor, in so much that the Corpuscles of Gold will, with those of the *Menstruum*, pass through Cap-Paper, and with them also coagulate into a Chrystalline Salt. And I have further try'd, that

with a small quantity of a certain Saline Substance I prepar'd, I can easily enough sublime Gold into the form of red Chry-stalls of a considerable length; and many other wayes may Gold be disguis'd, and help to constitute Bodies of very differ-ing Natures both from It and from one another, and nevertheless be afterward reduc'd to the self-same Numerical, Yellow, Fixt, Ponderous and Malleable Gold it was before its commixture. Nor is it only the fixedst of Metals, but the most fugitive, that I may employ in fa-vour of our Proposition: for Quicksilver will with divers Metals compose an *A-malgam*, with divers *Menstruums* it seems to be turn'd into a Liquor, with *Aqua fortis* it will be brought into either a red or white Powder or precipitate, with Oyl of Vitriol into a pale Yellow one, with Sulphur it will compose a blood-red and volatile Cinaber, with some Sa-line Bodies it will ascend in form of a Salt which will be dissoluble in water; with *Regalus* of Antimony and Silver I have seen it sublim'd into a kinde of Cryst ls, with another Mixture I reduc'd it into a malleable Body, into a hard and brittle Substance by another: And
some

some there are who affirm, that by proper Additaments they can reduce Quick-silver into Oyl, nay into Glafs, to mention no more. And yet out of all these exotick Compounds, we may recover the very same running Mercury that was the main Ingredient of them, and was so disguis'd in them. Now the Reason (proceeds *Carneades*) that I have represented these things concerning Gold and Quicksilver, is, That it may not appear absurd to conceive, that such little primary Masses or Clusters, as our Proposition mentions, may remain undissipated, notwithstanding their entring into the composition of various Concretions, since the Corpuscle of Gold and Mercury, though they be not primary Concretions of the most minute Particles of matter, but confessedly mixt Bodies, are able to concur plentifully to the composition of several very differing Bodies, without losing their own Nature or Texture, or having their cohesion violated by the divorce of their associated parts or Ingredients.

Give me leave to add (saies *Eleutherius*) on this occasion; to what you now observ'd, that as confidently as some
Chymists

Chymists, and other modern Innovators in Philosophy are wont to object against the Peripateticks, That from the mixture of their four Elements there could arise but an inconsiderable variety of compound Bodies; yet if the *Aristotelians* were but half as well vers'd in the works of Nature as they are in the Writings of their Master, the propos'd Objection would not so calmly triumph, as for want of Experiments they are fain to suffer it to do. For if we assigne to the Corpuscles, whereof each Element consists, a peculiar size and shape, it may easily enough be manifested, That such differinglly figur'd Corpuscles may be mingled in such various Proportions, and may be connected so many several waies, that an almost incredible number of variously qualified Concretes may be compos'd of them. Especially since the Corpuscles of one Element may barely, by being associated among themselves, make up little Masses of differing size and figure from their constituent parts: and since also to the strict union of such minute Bodies there seems oftentimes nothing requisite, besides the bare Contact of a great part of their Surfaces.

And

And how great a variety of *Phænomena* the same matter, without the addition of any other, & only several ways dispos'd or contex'd, is able to exhibit, may partly appear by the multitude of differing Engins which by the contrivances of skilful Mechanilians, and the dexterity of expert Workmen, may be made of Iron alone. But in our present case being allow'd to deduce compound Bodies from four very differently qualified sorts of matter, he who shall but consider what you freshly took notice of concerning the new Concretes resulting from the mixture of incorporated Minerals, will scarce doubt but that the four Elements mannag'd by Natures Skill may afford a multitude of differing Compounds.

I am thus far of your minde (saies *Carneades*) that the *Aristotelians* might with probability deduce a much greater number of compound Bodies from the mixture of their four Elements, than according to their present *Hypothesis* they can, if instead of vainly attempting to deduce the variety and proprieties of all mixt Bodies from the Combinations & Temperaments of the four Elements, as they are (among them) endowd
with

with the four first Qualities, they had endeavoured to do it by the Bulk and Figure of the smallest parts of those supposed Elements. For from these more Catholick and Fruitfull Accidents of the Elementary matter may spring a great variety of Textures, upon whose Account a multitude of compound Bodies may very much differ from one another. And what I now observe touching the four Peripatetick Elements, may be also applyed, *mutatis mutandis*, (as they speak) to the Chymical Principles. But (to take notice of that by the by) both the one and the other, must, I fear, call in to their assistance something that is not Elementary, to excite or regulate the motion of the parts of the matter, and dispose them after the manner requisite to the Constitution of particular Concretes. For that otherwise they are like to give us but a very imperfect account of the Origine of very many mixt Bodies, It would, I think, be no hard matter to perswade you, if it would not spend time, and were no Digression, to examine, what they are wont to alledge of the Origine of the Textures and Qualities of mixt Bodies,
from

from a certain substantial Form, whose Origination they leave more obscure than what it is assum'd to explicate.

But to proceed to a new Proposition.

I shall not peremptorily deny, that from Proposⁿ
III.
*most of such mixt Bodies as partake ei-
ther of Animal or Vegetable Nature,
there may by the Help of the Fire, be ac-
tually obtain'd a determinate number
(whether Three, Four, or Five, or fe-
wer or more) of Substances, worthy of
differing Denominations.*

Of the Experiments that induce me to make this Concession, I am like to have occasion enough to mention several in the prosecution of my Discourse. And therefore, that I may not hereafter be oblig'd to trouble You and myself with needless Repetitions, I shall now only desire you to take notice of such Experiments, when they shall be mention'd, and in your thoughts referre them hither.

To these three Concessions I have but this Fourth to add, That

Propos.
IV.

It may likewise be granted, that those distinct Substances, which Concretes generally either afford or are made up of, may without very much Inconvenience be call'd the Elements or Principles of them.

When I said, *without very much Inconvenience*, I had in my Thoughts that sober Admonition of Galen, *Cum de re constet, de verbis non est Litigandum*. And therefore also I scruple not to say *Elements* or *Principles*, partly because the Chymists are wont to call the Ingredients of mixt Bodies, *Principles*, as the *Aristotelians* name them *Elements*; I would here exclude neither. And, partly, because it seems doubtfull whether the same Ingredients may not be call'd *Principles*; as not being compounded of any more primary Bodies; and *Elements*, in regard that all mixt Bodies are compounded of them. But I thought it requisite to limit my Concession by premising the words, *very much*, to the word *Inconvenience*, because that though the Inconvenience of calling the distinct Substances, mention'd in the Proposition *Elements* or *Principles*, be not very great,

great, yet that it is Impropriety of Speech, and consequently in a matter of this moment not to be altogether overlook'd. You will perhaps think, as well as I, by that time you shall have heard the following part of my Discourse, by which you will best discern what Construction to put upon the former Propositions, and how far they may be look'd upon, as things that I concede as true, & how far as things I only represent as specious enough to be fit to be consider'd.

And now *Eleutherius* (continues *Carneades*) I must resume the person of a Sceptick, and as such, propose some part of what may be either dislik't, or at least doubted of in the common *Hypothesis* of the Chymists. which if I examine with a little the more freedom, I hope I need not desire you (a person to whom I have the Happiness of being so well known) to look upon it as something more suitable to the Employment whereto the Company has, for this Meeting, doom'd me; than either to my Humour or my Custom.

Now though I might present you many things against the Vulgar Chymical Opinion of the three Principles, and the

Ex-

Experiments wont to be alleg'd as Demonstrations of it, yet those I shall at present offer you may be conveniently enough comprehended in four Capital Considerations; touching all which I shall only premise this in general, That since it is not my present Task so much to assert an *Hypothesis* of my own, as to give an Account wherefore I suspect the truth of that of the Chymists; it ought not to be expected that all my Objections should be of the most cogent sort, since it is reason enough to Doubt of a propos'd Opinion, that there appears no cogent Reason for it.

To come then to the Objections themselves; I consider in the first place, That notwithstanding what common Chymists have prov'd or taught, it may reasonably enough be Doubted, how far, and in what sence, Fire ought to be esteem'd the genuine and universal Instrument of analyzing mixt Bodies.

This Doubt, you may remember, was formerly mention'd, but so transiently discours'd of, that it will now be fit to insist upon it; And manifest that it was not so inconsiderately propos'd as our Adversaries then imagin'd.

But,

But, before I enter any further into this Disquisition, I cannot but here take notice, that it were to be wish'd, our Chymists had clearly inform'd us what kind of Division of Bodies by Fire must determine the number of the Elements: For it is nothing near so easy as many seem to think, to determine distinctly the Effects of Heat, as I could easily manifest, if I had leasure to shew you how much the Operations of Fire may be diversify'd by Circumstances. But not wholly to pass by a matter of this Importance, I will first take notice to you, that *Guajacum* (for instance) burnt with an open Fire in a Chimney, is sequestred into Ashes and Soot, whereas the same Wood distill'd in a Retort does yield far other Heterogeneities, (to use the *Helmontian* expression) and is resolv'd into Oyl, Spirit, Vinegar, Water and Charcoal; the last of which to be reduc'd into Ashes, requires the being farther calcin'd than it can be in a close Vessel: Besides having kindled Amber, and held a clean Silver Spoon, or some other Concave and smooth Vessel over the Smoak of its Flame, I observ'd the Soot into which that Fume condens'd,

to be very differing from any thing that I had observ'd to proceed from the Steam of Amber purposely (for that is not usual) distilled *per se* in close Vessels. Thus having, for Tryals sake, kindled Camphire and catcht the Smoak that copiously ascended out of the Flame, it condens'd into a Black and unctuous Soot, which would not have been guess'd by the Smell or other Properties to have proceeded from Camphire: whereas having (as I shall elsewhere more fully declare) expos'd a quantity of that Fugitive Concrete to a gentle heat in a close Glass-Vessel, it sublim'd up without seeming to have lost any thing of its whiteness, or its Nature, both which it retain'd, though afterwards I so encreased the Fire as to bring it to Fusion. And, besides Camphire, there are divers other Bodies (that I elsewhere name) in which the heat in close Vessels is not wont to make any separation of Heterogeneities, but only a comminution of Parts, those that rise first being Homogeneal with the others, though subdivided into smaller Particles: whence Sublimations have been stiled, *The Pestles of the Chymists*. But not here to

to mention what I elsewhere take notice of, concerning common Brimstone once or twice sublim'd, that expos'd to a moderate Fire in Subliming-Pots, it rises all into dry, and almost tasteless, Flowers; Whereas being expos'd to a naked Fire it affords store of a Saline and Fretting Liquor: Not to mention this, I say, I will further observe to you, that as it is considerable in the *Analysis* of mixt Bodies, whether the Fire act on them when they are expos'd to the open Air, or shut up in close Vessels, so is the degree of Fire, by which the *Analysis* is attempted, of no small moment. For a milde *Balneum* will sever unfermented Blood (for instance) but into Phlegme and *Caput mortuum*, the latter whereof (which I have sometimes had) hard, brittle, and of divers Colours, (transparent almost like Tortoise-shell) press'd by a good Fire in a Retort yields a Spirit, an Oyl or two, and a volatile Salt, besides another *Caput mortuum*. It may be also pertinent to our present Designe, to take notice of what happens in the making and distilling of Sope; for by one degree of Fire the Salt, the Water, and the Oyl or Grease, whereof that factitious

Concrete is made up, being boyl'd up together are easily brought to mingle and incorporate into one Mass; but by another and further degree of Heat the same Mass may be again divided into an oleagenous, and aqueous, a Saline, and an Earthy part. And so we may observe that impure Silver and Lead being expos'd together to a moderate Fire will thereby be colligated into one Mass, and mingle *per minima*, as they speak; whereas a much vehementer Fire will drive or carry off the baser Metals (I mean the Lead, and the Copper or other Alloy) from the Silver, though not, for ought appears, separate them from one another. Besides, when a Vegetable abounding in fixt Salt is analyz'd by a naked Fire, as one degree of Heat will reduce it into Ashes, (as the Chymists themselves teach us) so, by only a further degree of Fire, those Ashes may be vitrified and turn'd into Glass. I will not stay to examine how far a meere Chymist might on this occasion demand, If it be lawful for an *Aristotelian* to make Ashes, (which he mistakes for meere Earth) pass for an Element, because by one degree of Fire it may be pro-

produc'd, why a Chymist may not upon the like Principle argue, that Glafs is one of the Elements of many Bodies, because that also may be obtain'd from them, barely by the Fire? I will not, I say, lose time to examine this, but observe, that by a Method of applying the Fire, such similar Bodies may be obtain'd from a Concrete, as Chymists have not been able to separate; either by barely burning it in an open Fire, or by barely distilling it in close Vessels. For to me it seems very considerable, and I wonder that men have taken so little notice of it, that I have not by any of the common wayes of Distillation in close Vessels, seen any separation made of such a volatile Salt as is afforded us by Wood, when that is first by an open Fire divided into Ashes and Soot, and that Soot is afterwards plac'd in a strong Retort, and compell'd by an urgent Fire to part with its Spirit, Oyl and Salt; for though I dare not peremptorily deny, that in the Liquors of *Guajacum* and other Woods distill'd in Retorts after the common manner, there may be Saline parts, which by reason of the Analogy may pretend to the name of some kinde of

volatile Salts; yet questionless there is a great disparity betwixt such Salts and that which we have sometimes obtain'd upon the first Distillation of Soot (though for the most part it has not been separated from the first or second Rectification, and sometimes not till the third) For we could never yet see separated from Woods analyz'd only the vulgar way in close vessels any volatile Salt in a dry and Saline form, as that of Soot, which we have often had very Chrystalline and Geometrically figur'd. And then, whereas the Saline parts of the Spirits of *Guajacum*, &c. appear upon distillation sluggish enough, the Salt of Soot seems to be one of the most volatile Bodies in all Nature; and if it be well made will readily ascend with the milde heat of a Furnace, warm'd only by the single Wieck of a Lamp, to the top of the highest Glass Vessels that are commonly made use of for Distillation: and besides all this, the taste and smell of the Salt of Soot are exceeding differing from those of the Spirits of *Guajacum*, &c. and the former not only smells & tastes much less like a vegetable Salt, than like that of Harts-horn, and other
Animal

Animal Concretes; but in divers other Properties seems more of Kinne to the Family of Animals, than to that of vegetable Salts, as I may elsewhere (God permitting) have an occasion more particularly to declare. I might likewise by some other Examples manifest, That the Chymists, to have dealt clearly, ought to have more explicitly and particularly declar'd by what Degree of Fire, and in what manner of Application of it, they would have us Judge a Division made by the Fire to be a true *Analysis* into their Principles, and the Productions of it to deserve the name of Elementary Bodies. But it is time that I proceed to mention the particular Reasons that incline me to Doubt, whether the Fire be the true and universal Analyzer of mixt Bodies; of which Reasons what has been already objected may pass for one.

In the next place I observe, That there are some mixt Bodies from which it has not been yet made appear, that any degree of Fire can separate either Salt or Sulphur or Mercury, much less all the Three. The most obvious Instance of this Truth is Gold, which is a Body so fix'd, and wherein the Elementary

Ingredients (if it have any) are so firmly united to each other, that we finde not in the operations wherein Gold is expos'd to the Fire, how violent soever, that it does discernably so much as lose of its fixedness or weight, so far is it from being dissipated into those Principles, whereof one at least is acknowledged to be Fugitive enough; and so justly did the Spagyricall Poet somewhere exclaim,

Cuncta adeo miris illic compagibus hærent.

* *Gasto*
Claveus
Apolog.
Argur. &
Chryso-
pera.

And I must not omit on this occasion to mention to you, *Eleutherius*, the memorable Experiment that I remember I met with in * *Gasto Claveus*, who, though a Lawyer by Profession, seems to have had no small Curiosity and Experience in Chymical affairs: He relates then, that having put into one small Earthen Vessel an Ounce of the most pure Gold, and into another the like weight of pure Silver, he plac'd them both in that part of a Glasse-house Furnace wherein the Workmen keep their Metal, (as our English Artificers call their Liquid Glasse) continually melted, and that having there kept both the Gold and the

the Silver in constant Fusion for two Moneths together, he afterwards took them out of the Furnace and the Vessels, and weighing both of them again, found that the Silver had not lost above a $\frac{1}{12}$ part of its weight, but the Gold had not of his lost any thing at all. And though our Author endeavours to give us of this a Scholastick Reason, which I suppose you would be as little satisfied with, as I was when I read it; yet for the matter of Fact, which will serve our present turne, he assures us, that though it be strange, yet Experience it self taught it him to be most true.

And though there be not perhaps any other Body to be found so perfectly fix'd as Gold, yet there are divers others so fix'd or compos'd, at least of so strictly united parts, that I have not yet observ'd the Fire to separate from them any one of the Chymists Principles. I need not tell you what Complaints the more Candid and Judicious of the Chymists themselves are wont to make of those Boasters that confidently pretend, that they have extract'd the Salt or Sulphur of Quicksilver, when they have disguis'd it by Additaments, wherewith it resembles

sembles the Concretes whose Names are given it; whereas by a skilfull and rigid *Examen*, it may be easily enough stript of its Disguises, and made to appear again in the pristine form of running Mercury. The pretended Salts and Sulphurs being so far from being Elementary parts extracted out of the Bodie of Mercurie, that they are rather (to borrow a terme of the Grammarians) De-compound Bodies, made up of the whole Metal and the *Menstruum*, or other Additaments imploy'd to disguise it. And as for Silver, I never could see any degree of Fire make it part with any of its three Principles. And though the Experiment lately mentioned from *Claveus* may beget a Suspition that Silver may be dissipated by Fire, provided it be extreemly violent and very lasting; yet it will not necessarily follow, that because the Fire was able at length to make the Silver lose a little of its weight, it was therefore able to dissipate it into its Principles. For first I might alledge that I have observ'd little Grains of Silver to lie hid in the small Cavities (perhaps glas'd over by a vitrifying heat) in Crucibles, wherein Silver has been long kept in Fusion, whence

whence some Goldsmiths of my Acquaintance make a Benefit by grinding such Crucibles to powder, to recover out of them the latent particles of Silver. And hence I might argue, that perhaps *Claveus* was mistaken, and imagin'd that Silver to have been driven away by the Fire, that indeed lay in minute parts hid in his Crucible, in whose pores so small a quantity as he mist of so ponderous a Bodie might very well lie conceal'd.

But Secondly, admitting that some parts of the Silver were driven away by the violence of the Fire, what proof is there that it was either the Salt, the Sulphur, or the Mercury of the Metal, and not rather a part of it homogeneous to what remain'd? For besides, that the Silver that was left seem'd not sensibly alter'd, which probably would have appear'd, had so much of any one of its Principles been separated from it; We finde in other Mineral Bodies of a less permanent nature than Silver, that the Fire may divide them into such minute parts, as to be able to carry them away with its self, without at all destroying their Nature. Thus we see that in the refining

fining of Silver, the Lead that is mix'd with it (to carry away the Copper or other ignoble Mineral that embases the Silver) will, if it be let alone, in time evaporate away upon the Test; but if (as is most usual amongst those that refine great quantities of Metals together) the Lead be blown off from the Silver by Bellows, that which would else have gone away in the Form of unheeded steam, will in great part be collected not far from the Silver, in the Form of a Darkish Powder or Calx; which, because it is blown off from Silver, they call Litharge of Silver. And thus *Agricola* in divers places informs us, when Copper, or the Ore of it is colliquated by the violence of the Fire with *Cadmia*, the Sparks, that in great multitudes do fly upwards, do some of them, stick to the vaulted Roofs of the Furnaces, in the form of little and (for the most part) White Bubbles, which therefore the Greeks, and, in imitation of them, our Drugsters call *Pompholyx*: and others more heavy partly adhere to the sides of the Furnace, and partly (especially if the Covers be not kept upon the Pots) fall to the Ground, and by reason of their
Ashy

Agricola
de Natura
Fossil. Lib.
9. Cap. 11.
& 12.

Ashy Colour as well as Weight were called by the same Greeks *σποδός*, which, I need not tell you, in their Language signifies Ashes. I might add, that I have not found that from Venetian Talck (I say Venetian because I have found other kinds of that Mineral more open) from the *Lapis Ossifragus*, (which the Shops call *Ostiacolla*) from *Muscovia* Glasse, from pure and Fusible Sand (to mention now no other Concretes) those of my Acquaintance that have try'd, have been able by the Fire to separate any one of the Hypostatical Principles; which you will the less scruple to believe, if you consider that Glasse may be made by the bare Colliquation of the Salt and Earth remaining in the Ashes of a burnt Plant, and that yet common Glasse, once made, does so far resist the violence of the Fire, that most Chymists think it a Body more undestroyable than Gold it self. For if the Artificer can so firmly unite such comparative gross Particles as those of Earth and Salt that make up common Ashes, into a Body indissoluble by Fire, why may not Nature associate in divers Bodies the more minute Elementary Corpuscles she has at hand too firmly to
let

let them be separable by the Fire? And on this Occasion, *Eleutherius*, give me leave to mention to you two or three slight Experiments, which will, I hope, be found more pertinent to our present Discourse, than at first perhaps they will appear. The first is, that, having (for Tryals sake) put a quantity of that Fugitive Concrete, Camphire, into a Glass Vessel, and plac'd it in a gentle Heat, I found it (not leaving behinde, according to my Estimate, not so much as one Grain) to sublime to the Top of the Vessel into Flowers. Which in Whiteness, Smell, &c. seem'd not to differ from the Camphire it self. Another Experiment is that of *Helmont*, who in several places affirms, That a Coal kept in a Glass exactly clos'd will never be calcin'd to Ashes, though kept never so long in a strong Fire. To countenance which I shall tell you this Tryal of my own, That having sometimes distilled some Woods, as particularly Box, whilst our *Caput mortuū* remain'd in the Retort, it continued black like Charcoal, though the Retort were Earthen, and kept red-hot in a vehement Fire; but as soon as ever it was brought out of the candent Vessel

Vessel into the open Air, the burning Coals did hastily degenerate or fall asunder, without the Assistance of any new Calcination, into pure white Ashes. And to these two I shall add but this obvious and known Observation, that common Sulphur (if it be pure & freed from its Vinegar) being leasurely sublim'd in close Vessels, rises into dry Flowers, which may be presently melted into a Bodie of the same Nature with that which afforded them. Though, if Brimstone be burnt in the open Air, it gives, you know, a penetrating Fume, which being caught in a Glass-Bell condenses into that acid Liquor called Oyl of Sulphur *per Campanam*. The use I would make of these Experiments collated with what I lately told you out of *Agricola* is this, That even among the Bodies that are not fixt, there are divers of such a Texture, that it will be hard to make it appear, how the Fire, as Chymists are wont to imploy it, can resolve them into Elementary Substances. For some Bodies being of such a Texture that the Fire can drive them into the cooler and less hot part of the Vessels wherein they are included, and if need be, remove them from
place

place to place to fly the greatest heat, more easily than it can divorce their Elements (especially without the Assistance of the Air) we see that our Chymists cannot Analyze them in close Vessels, and of other compound Bodies the open Fire can as little separate the Elements. For what can a naked Fire do to Analyze a mixt Bodie, if its component Principles be so minute, and so strictly united, that the Corpuscles of it need less heat to carry them up, than is requisite to divide them into their Principles. So that of some Bodies the Fire cannot in close Vessels make any *Analysis* at all; and others will in the open Air fly away in the Forms of Flowers or Liquors, before the Heat can prove able to divide them into their Principles. And this may hold, whether the various similar parts of a Concrete be combin'd by Nature or by Art; For in factitious *Sal Armoniack* we finde the common and the Urinous Salts so well mingled, that both in the open Fire, and in subliming Vessels they rise together, as one Salt, which seems in such Vessels irresoluble by Fire alone. For I can shew you *Sal Armoniack* which after the ninth Sublimation does still retain its com-

compounded Nature. And indeed I scarce know any one Mineral, from which by Fire alone Chymists are wont to sever any Substance simple enough to deserve the name of an Element or Principle. For though out of native Cinnaber they distill Quicksilver, and though from many of those Stones that the Ancients called *Pyrites* they sublime Brimstone, yet both that Quicksilver and this Sulphur being very often the same with the common Minerals that are sold in the Shops under those names, are themselves too much compounded Bodies to pass for the Elements of such. And thus much, *Eleutherius*, for the Second Argument that belongs to my First Consideration; the others I shall the lesse insist on, because I have dwelt so long upon this.

Proceed we then in the next place to consider; That there are divers Separations to be made by other means, which either cannot at all, or else cannot so well be made by the Fire alone. When Gold and Silver are melted into one Mass, it would lay a great Obligation upon Refiners and Goldsmiths to teach them the Art of separating them
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by the Fire, without the trouble and charge they are fain to be at to sever them. Whereas they may be very easily parted by the Affusion of Spirit of Nitre or *Aqua fortis*; which the French therefore call *Eau de Depart*: So likewise the Metalline part of Vitriol will not be so easily and conveniently separated from the Saline part even by a violent Fire, as by the Affusion of certain Alkalizate Salts in a liquid Form upon the Solution of Vitriol made in common water. For thereby the acid Salt of the Vitriol leaving the Copper it had corroded to joyn with the added Salts, the Metalline part will be precipitated to the bottom almost like Mud. And that I may not give Instances only in De-compound Bodies, I will add a not usefless one of another kinde. Not only Chymists have not been able (for ought is vulgarly known) by Fire alone to separate true Sulphur from Antimony; but though you may finde in their Books many plausible Processes of Extracting it, yet he that shall make as many fruitless Tryals as I have done to obtain it by, most of them will, I suppose, be easily perswaded, that the Productions of such
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Processes are Antimonial Sulphurs rather in Name than Nature. But though Antimony sublim'd by its self is reduc'd but to a volatile Powder, or Antimonial Flowers, of a compounded Nature like the Mineral that affords them: yet I remember that some years ago I sublim'd out of Antimony a Sulphur, and that in greater plenty than ever I saw obtain'd from that Mineral, by a Method which I shall therefore acquaint you with, because Chymists seem not to have taken notice, of what Importance such Experiments may be in the Indagation of the Nature, and especially of the Number of the Elements. Having then purpose-ly for Tryals sake digested eight Ounces of good and well powder'd Antimony with twelve Ounces of Oyl of Vitriol in a well stop'd Glass-Vessel for about six or seven Weeks; and having caus'd the Mass (grown hard and brittle) to be distill'd in a Retort plac'd in Sand, with a strong Fire; we found the Antimony to be so open'd, or alter'd by the *Menstruum* wherewith it had been digested, That whereas crude Antimony, forc'd up by the Fire, arises only in Flowers, our Antimony thus handled afforded us

partly in the Receiver, and partly in the Neck and at the Top of the Retort, about an Ounce of Sulphur, yellow and brittle like common Brimstone, and of so Sulphureous a smell, that upon the unluting the Vessels it infected the Room with a scarce supportable stink. And this Sulphur, besides the Colour and Smell, had the perfect inflamability of common Brimstone, and would immediately kindle (at the Flame of a Candle) and burn blew like it. And though it seem'd that the long digestion wherein our Antimony and *Menstruum* were detain'd, did conduce to the better unlocking of the Mineral, yet if you have not the leasure to make so long a Digestion you may by incorporating with powder'd Antimony a convenient Quantity of Oyl of Vitriol, and committing them immediately to Distillation, obtain a little Sulphur like unto the common one, and more combustable than perhaps you will at first take notice of. For I have observ'd, that though (after its being first kindled) the Flame would sometimes go out too soon of its self, if the same Lump of Sulphur were held again to the Flame of a Candle, it would be

rekindled and burn a pretty while, not only after the second, but after the third or fourth accension. You, to whom I think I shewed my way of discovering something of Sulphureous in Oyl of Vitriol, may perchance suspect, *Eleutherius*, either that this Substance was some Venercal Sulphur that lay hid in that Liquor, and was by this operation only reduc'd into a manifest Body; or else that it was a compound of the unctuous parts of the Antimony, and the Saline ones of the Vitriol, in regard that (as *Gunter* informs us) divers learned men would have Sulphur to be nothing but a mixture made in the Bowels of the Earth of Vitriolate Spirits and a certain combustibile Substance. But the Quantity of Sulphur we obtain'd by Digestion was much too great to have been latent in the Oyl of Vitriol. And that Vitriolate Spirits are not necessary to the Construction of such a Sulphur as ours, I could easily manifest, if I would acquaint you with the several wayes by which I have obtain'd, though not in such plenty, a Sulphur of Antimony, colour'd and combustibile like common Brimstone. And though I am not now minded

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Cap. 6.

to discover them, yet I shall tell you, that to satisfy some Ingenious Men, that distill'd Vitriolate Spirits are not necessary to the obtaining of such a Sulphur as we have been considering, I did by the bare distillation of only Spirit of Nitre, from its weight of crude Antimony separate, in a short time, a yellow and very inflammable Sulphur, which, for ought I know, deserves as much the name of an Element, as any thing that Chymists are wont to separate from any Mineral by the Fire. I could perhaps tell you of other Operations upon Antimony, whereby That may be extracted from it, which cannot be forc'd out of it by the Fire; but I shall reserve them for a fitter Opportunity, and only annex at present this slight, but not impertinent Experiment. That whereas I lately observed to you, that the Urinous and common Salts whereof *Sal Armoniack* consists, remain'd unsever'd by the Fire in many successive Sublimations, they may be easily separated, and partly without any Fire at all, by pouring upon the Concrete finely powder'd, a Solution of Salt of Tartar, or of the Salt of Wood-Ashe; for upon your diligently mixing
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of these you will finde your Nose invaded with a very strong smell of Urine, and perhaps too your Eyes forc'd to water, by the same subtle & piercing Body that produces the stink; both these effects proceeding from hence, that by the Alcalizate Salt, the Sea Salt that enter'd the composition of the *Sal Armoniack* is mortify'd and made more fixt, and thereby a divorce is made between it and the volatile Urinous Salt, which being at once set at liberty, and put into motion, begins presently to fly away, and to offend the Nostrils and Eyes it meets with by the way. And if the operation of these Salts be in conveniēt Glasses promoted by warmth, though but by that of a Bath, the ascending Steames may easily be caught and reduc'd into a penetrant Spirit, abounding with a Salt, which I have sometimes found to be separable in a ChrySTALLINE Form. I might add to these Instances, that whereas Sublimate, consisting, as you know, of Salts & Quick-silver combin'd and carried up together by Heat, may be Sublim'd; I know not how often, by a like degree of Fire, without suffering any divorce of the component Bodies, the Mercury may be ea-

sily sever'd from the adhering Salts, if the Sublimate be distill'd from Salt of Tartar, Quick Lime, or such Alcalizate Bodies. But I will rather observe to you, *Eleutherius*, what divers ingenious men have thought somewhat strange; that by such an Additament that seems but only to promote the Separation, there may be easily obtain'd from a Concrete, that by the Fire alone is easily divisible into all the Elements that Vegetables are suppos'd to consist of, such a similar Substance as differs in many respects from them all, and consequently has by many of the most Intelligent Chymists been denied to be contain'd in the mixt Body. For I know a way, and have practis'd it, whereby common Tartar, without the addition of any thing that is not perfectly a Mineral, except Salt-petre, may by one Distillation in an Earthen Retort be made to afford good store of real Salt, readily dissoluble in water, which I found to be neither acid, nor of the smell of Tartar, and to be almost as volatile as Spirit of Wine it self, and to be indeed of so differing a Nature from all that is wont to be separated by Fire from Tartar, and divers

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Learned Men, with whom I discours'd of it, could hardly be brought to believe, that so fugitive a Salt could be afforded by Tartar, till I assur'd it them upon my own Knowledge. And if I did not think you apt to suspect me to be rather too backward than too forward to credit or affirm unlikely things, I could convince you by what I have yet lying by me of that anomalous Salt.

The Fourth thing that I shall alledge to countenance my first Consideration is, That the Fire even when it divides a Body into Substances of divers Consistences, does not most commonly analyze it into Hypostatical Principles, but only disposes its parts into new Textures, & thereby produces Concretes of a new indeed, but yet of a compound Nature. This Argument it will be requisite for me to prosecute so fully hereafter, that I hope you will then confess that 'tis not for want of good Proofs that I desire leave to suspend my Proofs till the Series of my Discourse shall make it more proper and seasonable to propose them.

It may be further alledg'd on the behalf of my First Consideration, That some such distinct Substances may be obtain'd

tain'd from some Concretes without Fire, as deserve no less the name of Elementary, than many that Chymists extort by the Violence of the Fire.

We see that the Inflamable Spirit, or as the Chymists esteem it, the Sulphur of Wine, may not only be separated from it by the gentle heat of a Bath, but may be distill'd either by the help of the Sun-Beams, or even of a Dunghill, being indeed of so Fugitive a Nature, that it is not easy to keep it from flying away, even without the Application of external heat. I have likewise observ'd that a Vessel full of Urine being plac'd in a Dunghill, the Putrefaction is wont after some weeks so to open the Body, that the parts disbanding the Saline Spirit, will within no very long time, if the Vessel be not stop't, fly away of it self; Insomuch that from such Urine I have been able to distill little or nothing else than a nauseous Phlegme, instead of the active and piercing Salt and Spirit that it would have afforded, when first expos'd to the Fire, if the Vessel had been carefully stop't.

And this leads me to consider in the Fifth place, That it will be very hard to
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prove, that there can no other Body or way be given which will as well as the Fire divide Concretes into several homogeneous Substances, which may consequently be call'd their Elements or Principles, as well as those separated or produc'd by the Fire For since we have lately seen, that Nature can successfully employ other Instruments than the Fire to separate distinct Substances from mixt Bodies, how know we, but that Nature has made, or Art may make, some such Substance as may be a fit Instrument to Analyze mixt Bodies, or that some such Method may be found by Humane Industry or Luck, by whose means compound Bodies may be resolv'd into other Substances, than such as they are wont to be divided into by the Fire. And why the Products of such an *Analysis* may not as justly be call'd the component Principles of the Bodies that afford them, it will not be easy to shew, especially since I shall hereafter make it evident, that the Substances which Chymists are wont to call the Salts, and Sulphurs, and Mercuries of Bodies, are not so pure and Elementary as they presume, and as their *Hypothesis* requires. And this may
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therefore be the more freely press'd upon the Chymists, because neither the *Paracelsians*, nor the *Helmontians* can reject it without apparent Injury to their respective Masters. For *Helmont* do's more than once Inform his Readers, that both *Paracelsus* and Himself were Possessors of the famous Liquor, *Alkabeſt*, which for its great power in resolving Bodies irresoluble by Vulgar Fires, he somewhere seems to call *Ignis Gehennæ*. To this Liquor he ascribes, (and that in great part upon his own Experience) such wonders, that if we suppose them all true, I am so much the more a Friend to Knowledge than to Wealth, that I should think the *Alkabeſt* a nobler and more desireable Secret than the Philosophers Stone it self. Of this Universal Dissolvent he relates, That having digested with it for a comperent time a piece of Oaken Charcoal, it was thereby reduc'd into a couple of new and distinct Liquors, discriminated from each other by their Colour and Situation, and that the whole body of the Coal was reduc'd into those Liquors, both of them separable from his Immortal *Menstruum*, which remain'd as fit for such Operations

ons as before. And he moreover tells us in divers places of his Writings, that by his powerful, and unwearied Agent, he could dissolve Metals, Marchasites, Stones, Vegetable and Animal Bodies of what kinde soever, and even Glasse itself (first reduc'd to powder,) and in a word, all kind of mixt Bodies in the World into their severall similar Substances, without any Residence or *Caput mortuum*. And lastly, we may gather this further from his Informations, That the homogeneous Substances obtainable from compound Bodies by his piercing Liquor, were oftentimes different enough both as to Number and as to Nature, from those into which the same Bodies are wont to be divided by common Fire. Of which I shall need in this place to mention no other proof, than that whereas we know that in our common *Analysis* of a mixt Body, there remains a terrestrial and very fixt Substance, oftentimes associated with a Salt as fixt; Our Author tells us, that by his way he could Distill over all Concretes without any *Caput mortuum*, and consequently could make those parts of the Concrete volatile, which in the Vulgar *Analysis* would have been

been fixt. So that if our Chymists will not reject the solemn and repeated Testimony of a Person, who cannot but be acknowledg'd for one of the greatest Spagyristis that they can boast of, they must not deny that there is to be found in Nature another Agent able to Analyze compound Bodies less violently, and both more genuinely and more universally than the Fire. And for my own part, though I cannot but say on this Occasion what (you know) our Friend Mr. Boyle is wont to say, when he is askt his Opinion of any strange Experiment; *That He that hath seen it hath more Reason to beleeve it, than He that hath not*, yet I have found *Helmont* so faithful a Writer, even in divers of his improbable Experiments (I alwaies except that Extravagant Treatise *De Magnetica Vulnerū Curatione*, which some of his Friends affirm to have been first publish'd by his Enemies) that I think it somewhat harsh to give him the Lye, especially to what he delivers upon his own proper Tryal. And I have heard from very credible Eye-witneses some things, and seen some others my self, which argue so strongly, that a circulated Salt, or a Menstruum (such

(such as it may be) may by being abstracted from compound Bodies, whether Mineral, Animal, or Vegetable, leave them more unlockt than a wary Naturalist would easily beleieve, that I dare not confidently measure the Power of Nature and Art by that of the *Menstruums*, and other Instruments that eminent Chymists themselves are as yet wont to employ about the Analyzing of Bodies; nor Deny that a *Menstruum* may at least from this or that particular Concrete obtain some apparently similar Substance, differing from any obtainable from the same Body by any degree or manner of Application of the Fire. And I am the more backward to deny peremptorily, that there may be such Openers of compound Bodies, because among the Experiments that make me speak thus warily, there wanted not some in which it appear'd not, that one of the Substances, not separable by common Fires and *Menstruums*, could retain any thing of the Salt by which the separation was made.

And here, *Eleutherius*, (saies *Carneades*) I should conclude as much of my Discourse as belongs to the first Consideration

sideration I propos'd, but that I foresee, that what I have delivered will appear liable to two such specious Objections, that I cannot safely proceed any further till I have examin'd them.

And first, one sort of Opposers will be forward to tell me, That they do not pretend by Fire alone to separate out of all compound Bodies their *Hypostatical* Principles; it being sufficient that the Fire divides them into such, though afterwards they employ other Bodies to collect the similar parts of the Compound; as 'tis known, that though they make use of water to collect the Saline parts of Ashes from the Terrestrial wherewith they are blended, yet it is the Fire only that Incinerates Bodies, and reduces the fix'd part of them into the Salt and Earth, whereof Ashes are made up. This Objection is not, I confess, inconsiderable, and I might in great part allow of it, without granting it to make against me, if I would content my self to answer, that it is not against those that make it that I have been disputing; but against those Vulgar Chymists, who themselves believe, and would fain make others do so, That the Fire is not only
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an universal, but an adequate and sufficient Instrument to analyze mixt Bodies with. For as to their Practice of Extracting the fix'd Salt out of Ashes by the Affusion of Water, 'tis obvious to alledge, that the Water does only assemble together the Salt, the Fire had before divided from the Earth: as a Sieve does not further break the Corn, but only bring together into two distinct heaps the Flower and the Bran, whose Corpuscles before lay promiscuously blended together in the Meal. This I say I might alledge, and thereby exempt my self from the need of taking any farther notice of the propos'd Objection. But not to lose the Rife it may afford me of Illustrating the matter under Consideration, I am content briefly to consider it, as far forth as my present Disquisition may be concern'd in it.

Not to repeat then what has been already answer'd, I say further, that though I am so civil an Adversary, that I will allow the Chymists, after the Fire has done all its work, the use of fair Water to make their Extractions with, in such cases wherein the Water does not cooperate with the Fire to make the *Ana-*

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lysis; yet since I Grant this but upon Supposition that the Water does only wash off the Saline Particles, which the Fire alone has before Extricated in the Analyz'd Body, it will not be Reasonable, that this Concession should Extend to other Liquors that may Add to what they Dissolve, nor so much as to other Cases than those Newly Mentioned: Which Limitation I Desire You would be Pleas'd to Bear in Mind till I shall Anon have Occasion to make Use of it. And This being thus Premis'd, I shall Proceed to Observe,

First, That Many of the Instances I Propos'd in the Preceding Discourse are Such, that the Objection we are Considering will not at all Reach Them. For Fire can no more with the Assistance of Water, than without it, Separate any of the Three Principles, either from Gold, Silver, Mercury, or some Others of the Concretes named Above.

Hence We may Inferre, That Fire is not an Universal Analyzer of all Mixt Bodies, since of Metals and Minerals, wherein Chymists have most Exercis'd Themselves, there Appear scarce Any which they are able to Analyze by Fire,
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Nay, from which they can Unquestionably Separate so much as any One of their Hypostatical Principles; Which may well Appear no small Disparagement, as well to their *Hypothesis*, as to their Pretensions.

It will also remain True, notwithstanding the Objection, That there may be Other Wayes, than the wonted *Analysis* by Fire, to Separate from a Compound Body Substances as Homogeneous as those that Chymists Scruple not to Reckon among their *Tria Prima* (as some of them, for Brevity Sake, call their Three Principles.)

And it Appears, That by Convenient Additaments such Substances may be Separated by the Help of the Fire, as could not be so by the Fire alone. Witness the Sulphur of Antimony.

And Lastly, I must Represent, That since it appears too that the Fire is but One of the Instruments that must be Employ'd in the Resolution of Bodies, We may Reasonably Challenge the Liberty of doing Two Things. For whenever any *Menstruum* or other Additament is Employ'd, together with the Fire to Obtain a Sulphur or a Salt from

a Body, We may well take the Freedom to Examine, whether or no That *Menstruum* do barely Help to Separate the Principle Obtain'd by It, or whether there Intervene not a Coalition of the Parts of the Body Wrought upon with Those of the *Menstruum*, whereby the Produc'd Concrete may be Judg'd to Result from the Union of Both. And it will be farther Allowable for Us to Consider, how far any Substance, Separated by the Help of such Additaments, Ought to pass for one of the *Tria Prima*; since by One Way of Handling the same Mixt Body, it may, according to the Nature of the Additaments, and the Method of Working upon it, be made to Afford differing Substances from those Obtainable from it by other Additaments, and another Method, nay and (as may appear by what I Formerly told You about Tartar) Differing from any of the Substances into which a Concrete is Divisible by the Fire without Additaments, though perhaps those Additaments do not, as Ingredients, enter the Composition of the Obtained Body, but only Diversify the Operation of the Fire upon the Concrete; and though that

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Concrete by the Fire alone may be Divided into a Number of Differing Substances, as Great as any of the Chymists; that I have met with, teach us that of the Elements to be. And having said thus much (saies *Carneades*) to the Objection likely to be Propos'd by some Chymists, I am now to Examine that which I Foresee will be Confidently press'd by Divers Peripateticks, who, to Prove Fire to be the true Analyzer of Bodies, will Plead, That it is the very Definition of Heat given by *Aristotle*, and Generally Received, *Congregare Homogenea, & Heterogenea Segregare*, to Assemble Things of a Resembling, and Disjoyn those of a Differing Nature. To this I answer, That this Effect is far from being so Essential to Heat, as 'tis Generally Imagin'd; for it rather Seems, that the True and Genuine Property of Heat is, to set a Moving, and thereby to Dissociate the parts of Bodies, and Subdivide them into Minute Particles, without regard to their being Homogeneous or Heterogeneous, as is apparent in the Boyling of Water, the Distillation of Quicksilver, or the Exposing of Bodies to the action of the Fire, whose Parts

either Are not (at least in that Degree of Heat Appear not) Dissimilar, where, all that the Fire can do, is to Divide the Body into very Minute Parts which are of the same Nature with one another, and with their *Totum*, as their Reduction by Condensation Evinces. And even when the Fire seems most to *Congregare Homogenea, & Segregare Heterogenea*, it Produces that Effect but by Accident; For the Fire does but Dissolve the Cement, or rather Shatter the Frame, or structure that kept the Heterogeneous Parts of Bodies together, under one Common Form; upon which Dissolution the Component Particles of the Mixt, being Freed and set at Liberty, do Naturally, and oftentimes without any Operation of the Fire, Associate themselves each with its Like, or rather do take those places which their Several Degrees of Gravity and Levity, Fixedness or Volatility (either Natural, or Adventitious from the Impression of the Fire) Assigne them. Thus in the Distillation (for Instance) of Man's Blood, the Fire do's First begin to Dissolve the *Nexus* or Cement of the Body; and then the Water, being the most

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Volatile, and Easy to be Extracted, is
 either by the Igneous Atomes, or the
 Agitation they are put into by the Fire,
 first carried up, till Forsaken by what
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 gree of Heat to make a Separation of its
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 Fire must be Increas'd which Carries
 over the Volatile Salt and the Spirit,
 they being, though Beleev'd to be Dif-
 fering Principles, and though Really of
 Different Consistency, yet of an almost
 Equal Volatility. After them, as less
 Fugitive, comes over the Oyl, and leaves
 behinde the Earth and the *Alkali*, which
 being of an Equal Fixedness, the Fire
 Severs them not, for all the Definition
 of the Schools. And if into a Red-hot
 Earthen or Iron Retort you cast the
 Matter to be Distill'd, You may Ob-
 serve, as I have often done, that the
 Predominant Fire will Carry up all the
 Volatile Elements Confusedly in one
 Fume, which will afterwards take their
 Places in the Receiver, either according
 to the Degree of their Gravity, or ac-

according to the Exigency of their respective Textures; the Salt Adhering, for the most part, to the Sides and Top, and the Phlegme Fastening it self there too in great Drops, the Oyle and Spirit placing themselves Under, or Above one another, according as their Ponderousness makes them Swim or Sink. For 'tis Observable, that though Oyl or Liquid Sulphur be one of the Elements Separated by this Fiery *Analysis*, yet the Heat which Accidentally Unites the Particles of the other Volatile Principles, has not alwayes the same Operation on this, there being divers Bodies which Yield Two Oyls, whereof the One sinks to the Bottom of that Spirit on which the other Swims; as I can shew You in some Oyls of the same Deers Blood, which are yet by Me: Nay I can shew you Two Oyls carefully made of the same Parcel of Humane Blood, which not only Differ extreamly in Colour, but Swim upon one another without Mixture, and if by Agitation Confounded will of themselves Divorce again.

And that the Fire doth oftentimes divide Bodies, upon the account that some
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of their Parts are more Fixt, and some more Volatile, how far soever either of these Two may be from a pure Elementary Nature is Obvious enough, if Men would but heed it in the Burning of Wood, which the Fire Dissipates into Smoake and Ashes: For not only the latter of these is Confessedly made up of two such Differing Bodies as Earth and Salt; but the Former being condens'd into that Soot which adheres to our Chimneys, Discovers it self to Contain both Salt and Oyl, and Spirit and Earth, (and some Portion of Phlegme too) which being, all almost, Equally Volatile to that Degree of Fire which Forces them up, (the more Volatile Parts Helping perhaps, as well as the Urgency of the Fire, to carry up the more Fixt ones, as I have often Try'd in Dulcify'd *Colcothar*, Sublim'd by *Sal Armoniack* Blended with it) are carried Up together, but may afterwards be Separated by other Degrees of Fire, whose orderly Gradation allowes the Disparity of their Volatileness to Discover it self. Besides, if Differing Bodies United into one Mass be both sufficiently Fixt, the Fire finding no Parts Volatile enough

enough to be Expell'd or carried up, makes no Separation at all; as may appear by a Mixture of Colliquated Silver and Gold, whose Component Metals may be easily Sever'd by *Aqua fortis*, or *Aqua Regis* (according to the Predominancy of the Silver or the Gold) but in the Fire alone, though vehement, the Metals remain unsever'd, the Fire only dividing the Body into smaller Particles (whose Littleness may be argued from their Fluidity) in which either the little nimble Atoms of Fire, or its brisk and numberless strokes upon the Vessels, hinder Rest and Continuity, without any Sequestration of Elementary Principles. Moreover, the Fire sometimes does not Separate, so much as Unite, Bodies of a differing Nature; provided they be of an almost resembling Fixedness, and have in the Figure of their Parts an Aptness to Coalition, as we see in the making of many Plaisters, Oyntments, &c. And in such Metalline Mixtures as that made by Melting together two parts of clean Brass with one of pure Copper, of which some Ingenious Trades-men cast such curious Patterns (for Gold and Silver Works)

as I have sometimes taken great Pleasure to Look upon. Sometimes the Bodies mingled by the Fire are Differing enough as to Fixidity and Volatility, and yet are so combin'd by the first Operation of the Fire, that it self does scarce afterwards Separate them, but only Pulverize them; whereof an Instance is afforded us by the Common Preparation of *Mercurius Dulcis*, where the Saline Particles of the Vitriol, Sea Salt, and sometimes Nitre, Employ'd to make the Sublimate, do so unite themselves with the Mercurial Particles made use of, first to Make Sublimate, and then to Dulcifie it, that the Saline and Metalline Parts arise together in many successive Sublimations, as if they all made but one Body. And sometimes too the Fire does not only not Sever the Differing Elements of a Body, but Combine them so firmly, that Nature herself does very seldom, if ever, make Unions less Dissoluble. For the Fire meeting with some Bodies exceedingly and almost equally Fixt, instead of making a Separation, makes an Union so strict, that it self, alone, is unable to Dissolve it; As we see, when an Alca-

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lizzate Salt and the Terrestrial Residue of the Ashes are Incorporated with pure Sand, and by Vitrification made one permanent Body, (I mean the coarse or greenish sort of Glass) that mocks the greatest Violence of the Fire, which though able to Marry the Ingredients of it, yet is not able to Divorce them. I can shew you some pieces of Glass which I saw flow down from an Earthen Crucible purposely Expos'd for a good while, with Silver in it, to a very vehement Fire. And some that deal much in the Fusion of Metals Informe me, that the melting of a great part of a Crucible into Glass is no great Wonder in their Furnaces. I remember, I have Observ'd too in the Melting of great Quantities of Iron out of the Oar, by the Help of store of Charcoal (for they Affirm that Sea-Coal will not yield a Flame strong enough) that by the prodigious Vehemence of the Fire, Excited by vast Bellows (made to play by great Wheels turn'd about by Water) part of the Materials Expos'd to it was, instead of being Analyz'd, Colliquated, and turn'd into a Dark, Solid and very Ponderous Glass, and that in such Quantity,

tity, that in some places I have seen the very High-ways, neer such Iron-works, mended with Heaps of such Lumps of Glasse, instead of Stones and Gravel. And I have also Observ'd, that some kind of Fire-stone it Self, having been employ'd in Furnaces wherein it was expos'd to very strong and lasting Fires, has had all its Fixt Parts so Wrought on by the Fire, as to be Perfectly Vitrifi'd, which I have try'd by Forcing from it Pretty large Pieces of Perfect and Transparent Glass. And lest You might think, *Eleutherius*, that the Question'd Definition of Heat may be Demonstrated, by the Definition which is wont to be given and Acquiesc'd in, of its contrary Quality, Cold, whose property is taught to be *tam Homogenea, quam Heterogenea congregare*, Give me leave to represent to You, that neither is this Definition unquestionable; for not to Mention the Exceptions, which a *Logician*, as such, may Take at it, I Consider that the Union of Heterogeneous Bodies which is Suppos'd to be the Genuine Production of Cold, is not Perform'd by every Degree of Cold. For we see for Instance that in the Urine of
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Healthy Men, when the Liquor has been Suffer'd a while to stand, the Cold makes a Separation of the Thinner Part from the Groffer, which Subsides to the Bottom, and Growes Opacous there; whereas if the Urinal be Warme, these Parts readily Mingle again, and the whole Liquor becomes Transparent as before. And when, by Glaciation, Wood, Straw, Dust, Water, &c. are Suppos'd to be United into one Lump of Ice, the Cold does not Cause any Real Union or Adunation, (if I may so Speak) of these Bodies, but only Hardening the Aqueous Parts of the Liquor into Ice, the other Bodies being Accidentally Present in that Liquor, are frozen up in it, but not Really United. And accordingly if we Expose a Heap of Mony Consisting of Gold, Silver and Copper Coynes, or any other Bodies of Differing Natures, which are Destitute of Aqueous Moisture, Capable of Congelation, to never so intense a Cold, we find not that these Differing Bodies are at all thereby so much as Compacted, much less United together; and even in Liquors Themselves we find *Phænomena* which

which Induce us to Question the Definition which we are examining. If *Paracelsus* his Authority were to be look't upon as a Sufficient Proof in matters of this Nature, I might here insist on that Process of his, whereby he Teaches that the Essence of Wine may be Sever'd from the Phlegme and Ignoble Part by the Assistance of Congelation: and because much Weight has been laid upon this Process, not only by *Paracelsians*, but other Writers, some of whom seem not to have perus'd it themselves, I shall give You the entire Passage in the Authors own Words, as I lately found them in the sixth Book of his *Archidoxis*, an Extract whereof I have yet about me; and it sounds thus. *De Vino sciendum est, facem phlegmaque ejus esse Mineram, & Vini substantiam esse corpus in quo conservatur Essentia, prout auri in auro latet Essentia. Juxta quod Practicam nobis ad Memoriam ponimus, ut non obliviscamur, ad hunc modum: Recipe Vinum vetustissimum & optimum quod habere poteris; calore saporeque ad placitum, hoc in vas vitreum infundas ut tertiam ejus partem impleat, & sigillo Hermetis occlusum*
in

in equino ventre mensibus quatuor, & in continuato calore teneatur qui non deficiat. Quo peracto, Hyeme cum frigus & gelu maxime saeviunt, his per mensem exponatur ut congeletur. Ad hunc modum frigus vini spiritum una cum ejus substantia protrudit in vini centrum, ac separat a phlegmate: Congelatum abjice, quod vero congelatum non est, id Spiritum cum substantia esse judicato. Hunc in Pelicanum positum in arena digestionem non adeo calida per aliquod tempus manere finito; Postmodum eximito vini Magisterium, de quo locuti sumus.

But I dare not *Eleu.* lay much Weight upon this Process, because I have found that if it were True, it would be but seldom Practicable in this Countrey upon the best Wine: for Though this present Winter hath been Extraordinary Cold, yet in very Keen Frosts accompanied with lasting Snowes, I have not been able in any Measure to Freez a thin Vial full of Sack; and even with Snow and Salt I could Freeze little more then the Surface of it; and I suppose *Eleu.* that tis not every Degree of Cold that is Capable of Congealing Liquors, which is able to make such an *Analysis*
if

(if I may so call it) of them by Separating their Aqueous and Spirituous Parts; for I have sometimes, though not often, frozen severally, Red-Wine, Urine and Milk, but could not Observe the expected Separation. And the Dutch-Men that were forc'd to Winter in that Icie Region neer the Artick Circle, call'd *Nova Zembla*, although they relate, as we shall see below, that there was a Separation of Parts made in their frozen Beer about the middle of *November* yet of the freezing of their Sack in *December* following they give but this Account: *Tea and our Sack, which is so hot, was Frozen very hard, so that when we were every Man to have his part, we were forc'd to melt it in the Fire; which we shar'd every second Day, about half a Pinte for a Man, wherewith we were forc'd to sustain our selves.* In which words they imply not, that their Sack was divided by the Frost into differing Substances, after such manner as their Beer had been. All which notwithstanding, *Eleu.* suppose that it may be made to appear, that even Cold sometimes may Congregare Homogenea, & Heterogenea Segregare: and to Manifest this I may tell you,

H that

that I did once, purposely, cause to be Decocted in fair Water a Plant abounding with Sulphureous and Spirituous Parts, and having expos'd the Decoction to a keen North-Wind in a very Frosty Night, I observ'd, that the more Aqueous Parts of it were turn'd by the next Morning into Ice, towards the innermost part of which, the more Agile and Spirituous parts, as I then conjectur'd, having Retreated, to shun as much as might be their Environing Enemy, they had there preserv'd themselves unfrozen in the Form of a high colour'd Liquor; the Aqueous and Spirituous parts having been so slightly (Blended rather than) United in the Decoction, that they were easily Separable by such a Degree of Cold, as would not have been able to have Divorc'd the Parts of Urine or Wine, which by Fermentation or Digestion are wont, as Tryal has inform'd me, to be more intimately associated each with other. But I have already intimated, *Eleutherius*, that I shall not Insist on this Experiment, not only because, having made it but once I may possibly have been mistaken in it; but also (and that principally) because of that much more

more full and eminent Experiment of the Separative Vertue of extream Cold, that was made, against their Wills, by the foremention'd Dutch men that Winter'd in *Nova Zembla*; the Relation of whose Voyage being a very scarce Book, it will not be amiss to give you that Memorable part of it which concerns our present Theme, as I caus'd the Passage to be extracted out of the Englished Voyage it self.

“ Gerard de Veer, John Cornelyson and
 “ Others, sent out of *Amsterdam*, Anno
 “ Dom. 1596. being forc'd by unseasonable Weather to Winter in *Nova Zembla*, near Ice-Haven; on the thirteenth of *October*, Three of us (saies the Relation) went aboard the Ship, and laden a Sled with Beer; but when we had laden it, thinking to go to our House with it, suddenly there arose such a Winde, and so great a Storm and Cold, that we were forc'd to go into the Ship again, because we were not able to stay without; and we could not get the Beer into the Ship again, but were forc'd to let it stand without upon the Sled: the Fourteenth, as we came out of the Ship, we found the Barrel of

“Beer standing upon the Sled, but it was
“fast frozen at the Heads; yet by rea-
“son of the great Cold, the Beer that
“purg’d out, froze as hard upon the Side
“of the Barrel, as if it had been glu’d
“thereon: and In that sort we drew
“it to our House, and set the Barrel an
“end, and drank it up; but first we were
“forc’d to melt the Beer, for there was
“scarce any unfrozen Beer in the bar-
“rel; but in that thick Yeast that was
“unfrozen, lay the Strength of the Beer,
“so that it was too strong to drink a-
“lone, and that which was frozen
“tasted like Water; and being melted
“we Mix’d one with the other, and so
“drank it; but it had neither Strength
“nor Taste.

And on this Occasion I remember,
that having the last very Sharp Winter
purposely try’d to Freeze, among other
Liquors, some Beer moderately strong,
in Glass Vessels, with Snow and Salt,
I observ’d, that there came out of the
Neck a certain thick Substance, which,
it seems, was much better able than the
rest of the Liquor (that I found turn’d
into Ice) to resist a Frost; and which,
by its Colour and consistence seem’d ma-
nifestly

nifestly enough to be Yeast, whereat, I confess, I am somewhat marvail'd, because I did not either discern by the Taste, or find by Enquiry, that the Beer was at all too New to be very fit to be Drank. I might confirm the Dutchmens Relation, by what happen'd a while since to a neere Friend of mine, who complained to me, that having Brew'd some Beer or Ale for his own drinking in *Holland* (where he then dwelt) the Keeness of the late bitter Winter froze the drink so as to reduce it into Ice, and a small Proportion of a very Strong and Spirituous Liquor. But I must not entertaine you any longer concerning Cold, not onely because you may think I have but lost my way into a Theme which does not directly belong to my present Undertaking; but because I have already enlarg'd myself too much upon the first Consideration I propos'd, though it appears so much a Paradox, that it seem'd to Require that I should say much to keep it from being thought a meer Extravagance; yet since I Undertook but to make the common Assumption

of our Chymists and *Aristotelians* appear Questionable, I hope I have so Perform'd that Task, that I may now Proceed to my Following Considerations, and Insist less on them than I have done on the First.

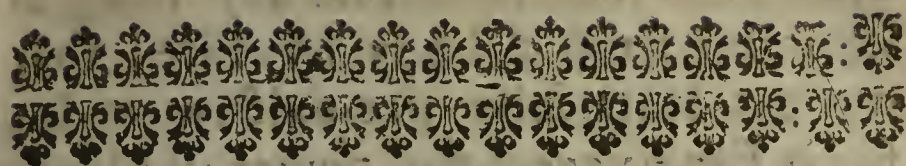
It is not my intention to dispute the
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The
 first of these is, that the ancients
 have often been mistaken in their
 observations of nature, and that their
 conclusions are often contrary to the truth.

The second of these is, that the ancients
 have often been mistaken in their
 reasoning, and that their conclusions
 are often contrary to the truth.

The third of these is, that the ancients
 have often been mistaken in their
 conclusions, and that their reasoning
 is often faulty.



T H E
SCEPTICAL CHYMIST

The Second Part.

TH E Second Consideration I Desire to have Notice Taken of, is This ; That it is not so Sure , as Both Chymists and *Aristotelians* are wont to Think it , that every Seemingly Similar or Distinct Substance that is Separated from a Body by the Help of the Fire , was Pre-existent in it as a Principle or Element of it.

That I may not make this Paradox a Greater than I needs must , I will First Briefly Explain what the Proposition means , before I proceed to Argue for it.

And I suppose You will easily Believe

H 4

That

That I do not mean that any thing is separable from a body by Fire, that was not Materially pre-existent in it; for it Far Exceeds the power of Merely Naturall Agents, and Consequently of the Fire, to produce anew, so Much as one Atome of Matter, which they can but Modifie and Alter, not Create; which is so Obvious a Truth, that almost all Sects of Philosophers have Deny'd the Power of producing Matter to Second Causes; and the *Epicureans* and some Others have Done the Like, in Reference to their Gods themselves.

e. Nor does the Proposition peremptorily Deny, but that some Things Obtain'd by the Fire from a Mixt Body, may have been more than barely Materially pre-existent in it, since there are Concretes, which before they be Expos'd to the Fire afford us several Documents of their abounding, some with Salt, and Others with Sulphur. For it will serve the present Turn, if it appear that diverse things Obtain'd from a Mixt Body expos'd to the Fire, were not its Ingredients Before: for if this be made to appear, it will be Rationall enough

nough to suspect that Chymists may Deceive themselves, and Others, in concluding Resolutely and Universally, those Substances to be the Elementary Ingredients of Bodies barely separated by the Fire, of which it yet may be Doubted, Whether there be such or No; at least till some other Argument, than that drawn from the *Analysis*, be Brought to resolve the Doubt.

That then which I Mean by the Proposition I am Explaining, is, That it may without Absurdity be Doubted whether or no the Differing Substances Obtainable from a Concrete Dissipated by the Fire were so Existent in it in that Forme (at least as to their minute Parts,) wherein we find them when the *Analysis* is over, that the Fire did only Dis-joyne and Extricate the Corpuscles of one Principle from those of the other wherewith before they were Blended.

Having thus Explain'd my Proposition, I shall endeavour to do two things, to prove it; The first of which is to shew that such Substances as Chymists call Principles may be produc'd *De novo*. (as they speak) And the other is to
make

make it probable, that by the Fire we may Actually obtain from some Mixt Bodies such Substances, as were not in the Newly Expounded sence, pre-existent in them.

To begin then with the First of these, I Consider that if it be as true, as 'tis probable, that Compounded Bodies Differ from One Another but in the Various Textures Resulting from the Bigness, Shape, Motion, and contrivance of their small parts, It will not be Irrational to conceive that one and the same parcel of the Universall Matter may by Various Alterations and Contextures be brought to Deserve the Name, sometimes of a Sulphureous, and sometimes of a Terrene, or Aqueous Body. And this I could more largely Explicate, but that our Friend Mr. Boyle has promis'd us something about Qualities, wherein the Theme I now willingly Resign him, Will I Question not be Studiously Enquired into. Wherefore what I shall now advance in favour of what I have lately Deliver'd shall be Deduc'd from Experiments made Divers Years since. The first of which would have been much more
con-

considerable, but that by some intervening Accidents I was Necessitated to lose the best time of the year, for a trial of the Nature of that I design'd; it being about the middle of *May* before I was able to begin an Experiment which should have then been two moneths old; but such as it was, it will not perhaps be impertinent to Give You this Narrative of it. At the time newly Mention'd, I caus'd My Gardiner (being by Urgent Occasions Hinder'd from being present my self) to dig out a convenient quantity of good Earth, and dry it well in an Oven, to weigh it, to put it in an Earthen pot almost level with the Surface of the ground, and to set in it a selected seed he had before received from me, for that purpose, of Squash, which is an Indian kind of Pom-pion, that Growes a pace; this seed I Ordered Him to Water only with Rain or Spring Water. I did not (when my Occasions permitted me to visit it) without delight behold how fast it Grew, though unseasonably sown; but the Hastning Winter Hinder'd it from attaining any thing neer its due and Wonted magnitude; (for I found
the

the same Autumn, in my Garden, some of those plants, by Measure, as big about as my Middle) and made me order the having it taken Up; which about the Middle of October was carefully Done by the same Gardiner, who a while after sent me this account of it; *I have Weighed the Pompion with the Stalk and Leaves, all which Weighed three pound wanting a quarter; Then I took the Earth, baked it as formerly, and found it just as much as I did at First, which made me think I had not dry'd it Sufficiently: then I put it into the Oven twice More, after the Bread was Drawn, and Weighed it the Second time, but found it Shrink little or nothing.*

But to deal Candidly with You, *Eleutherius*, I must not conceal from You the Event of another Experiment of this Kind made this present Summer, wherein the Earth seems to have been much more Wasted; as may appear by the following account, Lately sent me by the same Gardiner in these Words. *To give You an Account of your Cucumbers, I have Gain'd two Indifferent Fair Ones, the Weight of them is ten Pound and a Halfe, the Branches with the*
Roots

Roots Weighed four Pounds wanting two Ounces; and when I had weighed them I took the Earth, and bak'd it in several small Earthen Dishes in an Oven; and when I had so done, I found the Earth wanted a Pound and a halfe of what it was formerly; yet I was not satisfi'd, doubting the Earth was not dry: I put it into an Oven the Second Time, (after the Bread was drawn.) and after I had taken it out and weighed it, I found it to be the Same Weight. So I Suppose there was no Moisture left in the Earth. Neither do I think that the Pound and Halfe that was wanting was Drawn away by the Cucumber but a great Part of it in the Ordering was in Dust (and the like) wasted: (the Cucumbers are kept by themselves, lest You should send for the.) But yet in this Tryal, Eleutherius, it appears that though some of the Earth, or rather the dissoluble Salt harbour'd in it, were wasted, the main Body of the Plant consisted of Transmuted Water. And I might add, that a year after I caus'd the formerly mentioned Experiment, touching large Pompions, to be reiterated, with so good success, that if my memory does not much mis-inform me, it did not only much surpass any

any that I made before, but seem'd strangely to conclude what I am pleading for; though (by reason I have unhappily lost the particular Account my Gardiner writ me up of the Circumstances) I dare not insist upon them. The like Experiment may be as conveniently try'd with the seeds of any Plant, whose growth is hasty, and its size Bulky. If Tobacco will in These Cold Climates Grow well in Earth undung'd, it would not be amiss to make a Tryal with it; for 'tis an annual Plant, that arises where it prospers, sometimes as high as a Tall Man, and I have had leaves of it in my Garden neer a Foot and a Halfe broad. But the next time I Try this Experiment, it shall be with several seeds of the same sort, in the same pot of Earth, that so the event may be the more Conspicuous. But because every Body has not Conveniency of time and place for this Experiment neither, I made in my Chamber, some shorter and more Expeditionary Tryals. I took a Top of Spearmint, about an Inch Long, and put it into a good Vial full of Spring water, so as the upper part of the Mint was above the neck of the Glass, and the

the lower part Immers'd in the Water; within a few Dayes this Mint began to shoot forth Roots into the Water, and to display its Leaves, and aspire upwards; and in a short time it had numerous Roots and Leaves, and these very strong and fragrant of the Odour of the Mint. but the Heat of my Chamber, as I suppose, kill'd the Plant when it was grown to have a pretty thick Stalk, which with the various and ramified Roots, which it shot into the Water as if it had been Earth, presented in its Transparent Flower-pot a Spectacle not unpleasant to behold. The like I try'd with sweet Marjoram, and I found the Experiment succeed also, though somewhat more slowly, with Balm and Peniroyal, to name now no other Plants. And one of these Vegetables, cherish'd only by Water, having obtain'd a competent Growth, I did, for Tryals sake, cause to be Distill'd in a small Retort, and thereby obtain'd some Phlegme, a little Emphyreumaticall Spirit, a small Quantity of adust Oyl, and a *Caput mortuum*; which appearing to be a Coal, I concluded it to consist of Salt and Earth: but the

the Quantity of it was so small, that I forbore to Calcine it. The Water I us'd to nourish this Plant was not shift-ed nor renewed; and I chose Spring-water rather than Rain-water, because the latter is more discernably a kind of *πανωρεμία*, which, though it be granted to be freed from grosser Mixtures, seems yet to Contain in it, besides the Steams of several Bodies wandering in the Air, which may be suppos'd to impregnate it, a certain Spirituous Substance, which may be Extracted out of it, and is by some mistaken for the Spirit of the World Corporify'd, upon what Grounds, and with what Probability, I may elsewhere perchance, but must not now, Discourse to you.

But perhaps I might have sav'd a great part of my Labour. For I finde that *Helmont* (an Author more considerable for his Experiments, than many Learned men are pleas'd to think him) having had an Opportunity to prosecute an Experiment much of the same nature with those I have been now speaking of, for five Years together, obtain'd at the end of that time so notable a Quantity of Transmuted Water,
that

that I should scarce Think it fit to have his Experiment, and Mine Mention'd together, were it not that the Length of Time Requisite to this may deter the Curiosity of some, and exceed the pleasure of Others; and partly, that so Paradoxical a Truth as that which these Experiments seem to hold forth, needs to be Confirm'd by more Witnesses than one, especially since the Extragavancies and Untruths to be met with in *Helmonts* Treatise of the Magnetick Cure of Wounds, have made his Testimonies suspected in his other Writings, though as to some of the Unlikely matters of Fact he delivers in them, I might safely undertake to be his Compurgator. But that Experiment of his which I was mentioning to You, he saies, was this. He took 200 pound of Earth dry'd in an Oven, and having put it into an Earthen Vessel and moisten'd it with Rain water, he planted in it the Trunk of a Willow tree of five pound Weight; this he Water'd, as need required, with Rain or with Distill'd Water; and to keep the Neighbouring Earth from getting into the Vessel, he employ'd a plate of Iron tinn'd over and perforated

forated with many holes. Five years being efflux'd, he took out the Tree and weighed it, and (with computing the leaves that fell during four Autumnes) he found it to weigh 169 pound, and about three Ounces. And Having again Dry'd the Earth it grew in, he found it want of its Former Weight of 200 Pound, about a couple only of Ounces; so that 164 pound of the Roots, Wood, and Bark, which Constituted the Tree, seem to have Sprung from the Water. And though it appears not that *Helmont* had the Curiosity to make any *Analysis* of this Plant, yet what I lately told You I did to One of the Vegetables I nourish'd with Water only, will I suppose keep You from Doubting that if he had Distill'd this Tree, it would have afforded him the like Distinct Substances as another Vegetable of the same kind. I need not Subjoyne that I had it also in my thoughts to try how Experiments to the same purpose with those I related to You would succeed in other Bodies than Vegetables, because importunate Avocations having hitherto hinder'd me from putting my Design in Practice, I

can

can yet speak but Conjecturally of the Success : but the best is, that the Experiments already made and mention'd to you need not the Assistance of new Ones, to Verifie as much as my present task makes it concern me to prove by Experiments of this Nature.

One would suspect (saies *Eleutherius* after his long silence) by what You have been discoursing, that You are not far from *Helmonts* Opinion about the Origination of Compound Bodies, and perhaps too dislike not the Arguments which he imployes to prove it.

VVhat *Helmontian* Opinion, and what Arguments do you mean (askes *Carneades*)

VVhat you have been Newly Discoursing (replies *Eleutherius*) tells us, that You cannot but know that this bold and Acute Spagyrist scruples not to Assert that all mixt Bodies spring from one Element; and that Vegetables, Animals, Marchasires, Stones, Metalls, &c. are Materially but simple VVater disguis'd into these Various Formes, by the plastick or Formative Vertue of their seeds. And as for his Reasons you may find divers of them scatter'd up and
I 2 down

down his writings; the considerabl^e of which seem to be these three; The Ultimate Reduction of mixt Bodies into Insipid Water, the Vicissitude of the supposed Elements, and the production of perfectly mixt Bodies out of simple VWater. And first he affirms that the *Sal circulatus Paracelsi*, or his Liquor *Alkabeſt*, does adequately resolve Plants, Animals; and Mineralls into one Liquor or more, according to their several internall Disparities of Parts, (without *Caput mortuum*, or the Destruction of their seminal Vertues;) and that the *Alkabeſt* being abstracted from these Liquors in the same weight and Vertue wherewith it Dissolv'd them, the Liquors may by frequent Cohobations from chalke or some other idoneous matter, be Totally depriv'd of their seminal Endowments, and return at last to their first matter, Insipid VWater; some other wayes he proposes here and there to divest some particular Bodies of their borrow'd shapes, and make them remigrate to their first Simplicity. The second Topick whence *Helmont* drawes his Arguments, to prove VWater to be the Material cause of Mixt Bodies, I told You

You was this, that the other suppos'd Elements may be transmuted into one another. But the Experiments by him here and there produc'd on this Occasion, are so uneasie to be made and to be judg'd of, that I shall not insist on them; not to mention, that if they were granted to be true, his Inference from them is somewhat disputable; and therefore I shall pass on to tell You, That as, in his First Argument, our Paradoxical Author endeavours to prove Water the Sole Element of Mixt Bodies, by their Ultimate Resolution, when by his *Alkabeſt*, or some other conquering Agent, the Seeds have been Destroy'd, which Disguis'd them; or when by time those seeds are Weari'd, or Exantlated, or unable to Act their Parts upon the Stage of the Universe any Longer: So in his Third Argument he Endeavours to evince the same Conclusion, by the constitution of Bodies which he asserts to be nothing but Water Subdu'd by Seminal Vertues. Of this he gives here & there in his VVritings several Instances, as to Plants and Animals; but divers of them being Difficult either to be try'd or to be Understood, and others of them

being not altogether Unobnoxious to Exceptions, I think you have singl'd out the Principal and less Questionable Experiment when you lately mention'd that of the Willow Tree. And having thus, Continues *Eleutherius*, to Answer your Question, given you a Summary Account of what I am Confident, You know better than I do, I shall be very glad to receive Your Sence of it, if the giving it me will not too much Divert You from the Prosecution of your Discourse.

That *If* (replies *Carneades*) was not needlessly annex'd: for thorowly to examine such an Hypothesis and such Arguments would require so many Considerations, and Consequently so much time, that I should not now have the Leasure to perfect such a Digression, and much less to finish my Principal Discourse. Yet thus much I shall tell You at present, that you need not fear my rejecting this Opinion for its Novelty; since, however the *Helmontians* may in complement to their Master pretend it to be a new Discovery, Yet though the Arguments be for the most part his, the Opinion it self is very Antient: For *Diogenes*

ogenes Laertius and divers other Authors speak of *Thales*, as the first among the *Græcians* that made disquisitions upon nature. And of this *Thales*, I Remember, *Tully* informs us, that he taught all things were at first made of Water. And it seems by *Plutarch* and *Justin Martyr*, that the Opinion was Ancienter than he: For they tell us that he us'd to defend his Tenent by the Testimony of *Homer*. And a Greek Author, the (*Scholiast* of *Apollonius*) upon these VVords

Ἐξ ἰλύος ἐβλάσθη χθὼν αὐτῇ.

Argo:
naut. 44

The Earth of Slime was made,

Affirms, (out of *Zeno*) that the *Chaos*, whereof all things were made, was, according to *Hesiod*, VVater; which, settling first, became Slime, and then condens'd into solid Earth. And the same Opinion about the Generation of Slime seems to have been entertain'd by *Orpheus*, out of whom one of the Antients cites this Testimony,

Athen:
goras.

Ἐκ τῆς ὕδατος ἰλὺς κατίσθι.

Of Water Slime was made,

I 4

I 4

Universa- It seems also by what is delivered in
 rum rerum *Strabo* out of another Author concern-
 primordia ing the *Indians*, That they likewise held
 diversa that all things had differing Beginnings,
 esse, faci- but that of which the *V*World was made,
 endi au- was *V*Water. And the like Opinion has
 rem mun- been by some of the Antients ascrib'd
 di initim. to the *Phœnicians*, from whom *Thales*
Strabo himself is conceiv'd to have borrow'd
Geograph. it; as probably the Greeks did much of
lib. 15. cir- Theologie, and, as I am apt to think, of
ca medium. their Philosophy too; since the Devising
 of the Atomical *Hypothesis* commonly
 ascrib'd to *Leucippus* and his Disciple *De-*
mocritus, is by Learned Men attributed
 to one *Moschus* a *Phœnician*. And possi-
 bly the Opinion is yet antienter than so;
 For 'tis known that the *Phœnicians* bor-
 row'd most of their Learning from the
Hebrews. And among those that acknow-
 ledge the Books of *Moses*, many have
 been inclin'd to think *V*Water to have
 been the Primitive and Universal Mat-
 ter, by perusing the Beginning of *Gene-*
sis, where the *V*Waters seem to be men-
 tion'd as the Material Cause, not only
 of Sublunary Compound Bodies, but
 of all those that make up the Universe;
 whose Component Parts did orderly, as
 it

it were, emerge out of that vast Abyſſe, by the Operation of the Spirit of God, who is ſaid to have been moving Himſelf, as hatching Females do, (as the Original מרהפת, *Merabephet*, is ſaid to Deuter. Import, and it ſeems to ſignifie in one 32. 11. of the two other places, wherein alone I Jerem. have met with it in the Hebrew Bible) 23. 9. upon the Face of the Waters; which being, as may be ſuppos'd, Divinely Impregnated with the ſeeds of all things, were by that productive Incubation qualify'd to produce them. But you, I preſume, Expect that I ſhould Diſcourſe of this Matter like a Naturaliſt, not a Philologer. Wherefore I ſhall add, to Countenance *Helmonts* Opinion, That whereas he gives not, that I remember, any Inſtance of any Mineral Body, nor ſcarce of any Animal, generated of Water, a French Chymiſt, *Monsieur de Rochas*, has preſented his Readers an Experiment, which if it were punctually ſuch as he has deliver'd it, is very Notable. He then, Diſcourſing of the Generation of things according to certain Chymical and Metaphorical Notions (which I confeſs are not to me Intelligible) ſets down, among divers Speculations not per-

pertinent to our Subject, the following Narrative, which I shall repeat to you the sence of in English, with as little variation from the Literal sence of the French words, as my memory will enable me. *Having (saies he) discern'd such great Wonders by the Natural Operation of Water, I would know what may be done with it by Art Imitating Nature. Wherefore I took Water which I well knew not to be compounded, nor to be mix'd with any other thing than that Spirit of Life (whereof he had spoken before) and with a Heat Artificial, Continual and Proportionate, I prepar'd and dispos'd it by the above mention'd Graduations of Coagulation, Congelation, and Fixation, untill it was turn'd into Earth, which Earth produc'd Animals, Vegetables and Minerals. I tell not what Animals, Vegetables and Minerals, for that is reserv'd for another Occasion: but the Animals did Move of themselves, Eat, &c. — and by the true Anatomie I made of them, I found that they were compos'd of much Sulphur. little Mercury, and less Salt. — The Minerals began to grow and increase by converting into their own Nature one part of the Earth thereunto dispos'd; they were solid and heavy.*

heavy. And by this truly Demonstrative Science, namely Chymistry, I found that they were compos'd of much Salt, little Sulphur, and less Mercury.

But (saies *Carneades*) I have some Suspicions concerning this strange Relation, which make me unwilling to Declare an Opinion of it, unless I were satisfied concerning divers Material Circumstances that our Author has left unmentioned; though as for the Generation of Living Creatures, both Vegetable and Sensitive, it needs not seem Incredible, since we find that our common water (which indeed is often Impregnated with Variety of Seminal Principles and Rudiments) being long kept in a quiet place will putrifie and stink, and then perhaps too produce Moss and little Worms, or other Insects, according to the nature of the Seeds that were lurking in it. I must likewise desire you to take Notice, that as *Helmont* gives us no Instance of the Production of Minerals out of Water, so the main Argument that he employ's to prove that they and other Bodies may be resolv'd into water, is drawn from the Operations of his *Alkabeſt*, and consequently cannot be

be satisfactorily Examin'd by You and Me:

Yet certainly (saies *Eleutherius*) You cannot but have somewhat wonder'd as well as I, to observe how great a share of Water goes to the making up of Divers Bodies, whose Disguises promise nothing neer so much. The Distillation of Eeles, though it yielded me some Oyle, and Spirit, and Volatile Salt, besides the *Caput mortuum*, yet were all these so disproportionate to the Phlegm that came from them, (and in which at first they boyl'd as in a Pot of Water) that they seem'd to have bin nothing but coagulated Phlegm, which does likewise strangely abound in Vipers, though they are esteem'd very hot in Operation, and will in a Convenient Air survive some dayes the loss of their Heads and Hearts, so vigorous is their Vivacity. Mans Bloud it self as Spirituous, and as Elaborate a Liquor as 'tis reputed, does so abound in Phlegm, that, the other Day, Distilling some of it on purpose to try the Experiment (as I had formerly done in Deers Bloud) out of about seven Ounces and a halfe of pure Bloud we drew neere six Ounces of Phlegm, before any
of

of the more operative Principles began to arise and Invite us to change the Receiver. And to satisfy my self that some of these Animall Phlegms were void enough of Spirit to deserve that Name, I would not content my self to taste them only, but fruitlessly pour'd on them acid Liquors, to try if they contain'd any Volatile Salt or Spirit, which (had there been any there) would probably have discover'd it self by making an Ebullition with the Affused Liquor. And now I mention Corrosive Spirits, I am minded to Inform you, That though they seem to be nothing else but Fluid Salts, yet they abound in Water, as you may Observe, if either you Entangle, and so Fix their Saline Part, by making them Corrode some idoneous Body, or else if you mortifie it with a contrary Salt; as I have very manifestly Observ'd in the making a Medicine somewhat like *Helmont's Balsamus Samech*, with Distill'd Vinegar instead of Spirit of Wine, wherewith he prepares it: For you would scarce Beleeve (what I have lately Observ'd) that of that acid Spirit, the Salt of Tartar, from which it is Distill'd, will by mortifying and retaining

raining the acid Salt turn into worthless
 Phlegm neere twenty times its weight;
 before it be so fully Impregnated as to
 rob no more Distill'd Vinegar of its
 Salt. And though Spirit of Wine Exqui-
 sitely rectify'd seem of all Liquors to be
 the most free from Water, it being so
 Igneous that it will Flame all away
 without leaving the least Drop behinde
 it, yet even this Fiery Liquor is by
Helmont not improbably affirm'd, in
 case what he relates be True, to be Ma-
 terially Water, under a Sulphureous
 Disguise: For, according to him, in the
 making that excellent Medicine, *Paracel-*
sus his *Balsamus Samech*, (which is no-
 thing but *Sal Tartari* dulcify'd by Distil-
 ling from it Spirit of Wine till the Salt
 be sufficiently glutted with its Sulphur,
 and till it suffer the Liquor to be drawn
 off, as strong as it was pour'd on) when
 the Salt of Tartar from which it is Di-
 still'd hath retain'd, or depriv'd it of the
 Sulphureous parts of the Spirit of Wine,
 the rest, which is incomparably the
 greater part of the Liquor, will remi-
 grate into Phlegm. I added that Clause
[In case what he Relates be True] because
 I have not as yet sufficiently try'd it my-
 self.

self. But not only something of Experiment keeps me from thinking it, as many Chymists do, absurd, (though I have as well as they, in vain try'd it with ordinary Salt of Tartar) but besides that *Helmont* often Relates it, and draws Consequences from it; A Person noted for his Soberness and Skill in Spagyricall Preparations, having been askt by me, Whether the Experiment might not be made to succeed, if the Salt and Spirit were prepar'd according to a way suitable to my Principles, he affirm'd to me, that he had that way, I propos'd, made *Helmont's* Experiment succeed very well, without adding any thing to the Salt and Spirit. But our way is neither short nor Easie.

I have indeed (saies *Carneades*) sometimes wonder'd to see how much Phlegme may be obtain'd from Bodies by the Fire. But concerning that Phlegme I may anon have Occasion to note something, which I therefore shall not now anticipate. But to return to the Opinion of *Thales*, and of *Helmont*, I consider, that supposing the *Alkahest* could reduce all Bodies into water, yet whether that water, because insipid, must be Elementary

mentary, may not groundlessly be doubted; For I remember the Candid and Eloquent *Petrus Laurembergius* in his Notes upon *Sala's Aphorismes* affirms, that he saw an insipid *Menstruum* that was a powerfull Dissolvent; and (if my Memory does not much mis-inform me) could dissolve Gold. And the water which may be drawn from Quicksilver without Addition, though it be almost Tasteless; You will I believe think of a differing Nature from simple Water, especially if you Digest in it Appropriated Mineralls. To which I shall add but this; that this Consideration may be further extended. For I see no Necessity to conceive that the Water mention'd in the Beginning of *Genesis*, as the Universal Matter, was simple and Elementary Water; since though we should Suppose it to have been an Agitated Congeries or Heap consisting of a great Variety of Seminal Principles and Rudiments, and of other Corpuscles fit to be subdu'd and Fashion'd by them, it might yet be a Body Fluid like Water, in case the Corpuscles it was made up of, were by their Creator made small enough, and put into such an
actuall

aſtuall Motion as might make them
Glide along one another. And as we now
ſay, the Sea conſiſts of Water, (not-
withſtanding the Saline, Terreſtrial, and
other Bodies mingl'd with it,) ſuch a
Liquor may well enough be called Wa-
ter, becauſe that was the greateſt of the
known Bodies whereunto it was like;
Though, that a Body may be Fluid e-
nough to appear a Liquor, and yet con-
tain Corpuscles of a very differing Na-
ture, You will eaſily believe, if You but
expoſe a good Quantity of Vitriol in
a ſtrong Veſſel to a Competent Fire.
For although it contains both Aqueous,
Earthy, Saline, Sulphureous, and Metal-
line Corpuscles, yet the whole Maſs
will at firſt be Fluid like water, and
boyle like a ſeething pot.

I might eaſily (Continues *Carneades*)
enlarge my ſelf on ſuch Conſiderations;
if I were now Oblig'd to give You my
Judgment of the *Thaleſian*, and *Hel-
montian Hypotheſis*. But Whether or no
we conclude that all things were at firſt
Generated of Water, I may Deduce
from what I have try'd Concerning the
Growth of Vegetables, nourish'd with
water, all that I now propos'd to my Self

or need at present to prove, namely that Salt, Spirit, Earth, and ev'n Oyl (though that be thought of all Bodies the most opposite to Water) may be produc'd out of Water; and consequently that a Chymical Principle as well as a Peripatetick Element, may (in some cases) be Generated a new, or obtain'd from such a parcel of Matter as was not endow'd with the form of such a Principle or Element before.

And having thus, *Eleutherius*, Evinc'd that 'tis possible that such Substances as those that Chymists are wont to call their *Tria Prima*, may be Generated, a new: I must next Endeavour to make it Probable, that the Operation of the Fire does Actually (sometimes) not only divide Compounded Bodies into small Parts, but Compound those Parts after a new Manner, whence Consequently, for ought we Know, there may Emerge as well Saline and Sulphureous Substances, as Bodies of other Textures. And perhaps it will assist us in our Enquiry after the Effects of the Operations of the Fire upon other Bodies, to Consider a little, what it does to those Mixtures which being Productions of the Art of Man,

Man, We best know the Composition of. You may then be pleas'd to take Notice that though Sope is made up by the Sope-Boylers of Oyle or Grease, and Salt, and Water Diligently Incorporated together; yet if You expose the Mass they Constitute to a Graduall Fire in a Retort, You shall then indeed make a Separation, but not of the same Substances that were United into Sope, but of others of a Distant and yet not an Elementary Nature, and especially of an Oyle very sharp and Foetid, and of a very Differing Quality from that which was Employ'd to make the Sope: so, if you Mingle in a due Proportion, *Sal Armoniack* with Quick-Lime, and Distill them by Degrees of Fire, You shall not Divide the *Sal Armoniack* from the Quick-Lime, though the one be a Volatile, and the other a Fix'd Substance, but that which will ascend will be a Spirit much more Fugitive, Penetrant, and stinking, than *Sal Armoniack*; and there will remain with the Quick-Lime all, or very near all the Sea Salt, that concurr'd to make up the *Sal Armoniack*; concerning which Sea Salt I shall, to satisfy You how well it was United to the

Lime, informe You, that I have by making the Fire at length very Vehement, caus'd both the Ingredients to melt in the Retort it self into one Mass, and such Masses are apt to Relent in the Moist Air. If it be here Objected, that these Instances are taken from factitious Concretes which are more Compounded than those which Nature produces; I shall reply, that besides that I have Mention'd them as much to Illustrate what I propos'd, as to prove it; it will be Difficult to Evince that Nature her self does not make Decomposed Bodies; I mean, mingle together such mixt Bodies, as are already Compounded of Elementary, or rather of more simple ones. For Vitriol (for Instance) though I have sometimes taken it out of Minerrall Earths, where Nature had without any assistance of Art prepar'd it to my Hand, is really, though Chymists are pleas'd to reckon it among Salts, a Decomposed Body Consisting (as I shall have occasion to declare anon) of a Terrestriall Substance, of a Metal, and also of at least one Saline Body, of a peculiar, and not Elementary Nature. And we see also in Animals, that their
blood

blood may be compos'd of Divers very Differing Mixt Bodies, since we find it observ'd that divers Sea-Fowle tast rank of the Fish on which they ordinarily feed; and *Hippocrates* himself Observes, that a Child may be purg'd by the Milke of the Nurse, if she have taken *Elaterium*; which argues that the purging Corpuscles of the Medicament Concurr to make up the Milk of the Nurse; and that white Liquor is generally by Physicians suppos'd to be but blanch'd and alter'd Blood. And I remember I have observ'd, not farr from the *Alps*, that at a certain time of the Yeare the Butter of that Country was very Offensive to strangers, by reason of the rank tast of a certain Herb, whereon the Cows were then wont plentifully to feed. But (proceeds *Carneades*) to give you Instances of another kind, to shew that things may be obtain'd by the Fire from a Mixt Body that were not Pre-existent in it, let Me Remind You, that from many Vegetables there may without any Addition be Obtain'd Glasse, a Body, which I presume You will not say was Pre-existent in it, but produc'd by the Fire. To which I shall

add but this one Example more, namely that by a certain Artificial way of handling Quicksilver, You may without Addition separate from it at least a 5th. or 4th. part of clear Liquor, which with an Ordinary Peripatetick would pass for Water, and which a Vulgar Chymist would not scruple to call Phlegme, and which, for ought I have yet seen or heard, is not reducible into Mercury again, and Consequently is more than a Disguise of it. Now besides that divers Chymists will not allow Mercury to have any, or at least any Considerable Quantity of either of the Ignoble Ingredients, Earth and Water; Besides this, I say, the great Ponderousness of Quicksilver makes it very unlikely that it can have so much Water in it as may be thus obtain'd from it, since Mercury weighs 12 or 14 times as much as water of the same Bulk. Nay for a further Confirmation of this Argument, I will add this Strange Relation, that two Friends of mine, the one a Physician, and the other a Mathematician, and both of them Persons of unsuspected Credit, have Solemnly assured me, that after many Tryals they made, to re-
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duce Mercury into Water, in Order to a Philosophicall Work, upon Gold (which yet, by the way, I know prov'd Unsuccesfull) they did once by divers Cohobations reduce a pound of Quick-silver into almost a pound of Water, and this without the Addition of any other Substance, but only by pressing the Mercury by a Skilfully Manag'd Fire in purposely contriv'd Vessels. But of these Experiments our Friend (saies *Carneades*, pointing at the Register of this Dialogue) will perhaps give You a more Particular Account than it is necessary for me to do: Since what I have now said may sufficiently evince, that the Fire may sometimes as well alter Bodies as divide them, and by it we may obtain from a Mixt Body what was not Pre-existent in it. And how are we sure, that in no other Body what we call Phlegme is barely separated, not Produc'd by the Action of the Fire: Since so many other Mixt Bodies are of a much less Constant, and more alterable Nature, than Mercury (by many Tricks it is wont to put upon Chymists, and by the Experiments I told You of, about an hour

since) Appears to be. But because I shall ere long have Occasion to resume into Consideration the Power of the Fire to produce new Concretes, I shall no longer insist on this Argument at present; only I must mind You, that if You will not dis-believe *Helmonts* Relations, You must confess that the *Tria Prima* are neither ingenerable nor incorruptible Substances; since by his *Alkalest* some of them may be produc'd of Bodies that were before of another Denomination; and by the same powerfull *Menstruum* all of them may be reduc'd into insipid Water.

Here *Carneades* was about to pass on to his Third Consideration, when *Eleutherius* being desirous to hear what he could say to clear his second General Consideration from being repugnant to what he seem'd to think the true Theory of Miftion, prevented him by telling him, I somewhat wonder, *Carneades*, that You, who are in so many Points unsatisfied with the Peripatetick Opinion touching the Elements & Mixt Bodies, should also seem averse to that Notion touching the manner of Miftion, wherein the Chymists (though perhaps without

out knowing that they do so) agree with most of the Antient Philosophers that preceded *Aristotle*, and that for Reasons so considerable, that divers Modern Naturalists and Physicians, in other things unfavourable enough to the Spagyristis, do in this case side with them against the common Opinion of the Schools. If you should ask me (continues *Eleutherius*) what Reasons I mean? I should partly by the Writings of *Sennertus* and other learned Men, and partly by my own Thoughts, be supply'd with more, than 'twere at present proper for me to Insist largely on. And therefore I shall mention only, and that briefly, three or four. Of these, I shall take the First from the state of the Controversie it self, and the genuine Notion of Mixture, which though much intricated by the Schoolmen, I take in short to be this. *Aristotle*, at least as many of his Interpreters expound him, and as indeed he Teaches in some places, where he professedly Dissents from the Antients, declares Mixture to be such a mutual Penetration, and perfect Union of the mingl'd Elements, that there is no Portion of the mixt Body, how Minute soever, which does not contain

contain All, and Every of the Four Elements, or in which, if you please, all the Elements are not. And I remember, that he reprehends the Mistion taught by the Ancients, as too slight or gross, for this Reason, that Bodies mixt according to their *Hypothesis*, though they appear to humane Eyes, would not appear such to the acute Eyes of a *Lynx*, whose perfecter Sight would discern the Elements, if they were no otherwise mingled, than as his Predecessors would have it, to be but Blended, not United; whereas the Antients, though they did not all Agree about what kind of Bodies were Mixt, yet they did almost unanimously hold, that in a compounded Bodie, though the *Miscibilia*, whether Elements, Principles, or whatever they pleas'd to call them, were associated in such small Parts, and with so much Exactness, that there was no sensible Part of the Mass but seem'd to be of the same Nature with the rest, and with the whole; Yet as to the Atomes, or other Insensible Parcels of Matter, whereof each of the *Miscibilia* consisted, they retain'd each of them its own Nature, being but by Apposition or *Juxta* Position

united

united with the rest into one Bodie. So that although by vertue of this composition the mixt Body did perhaps obtain Divers new Qualities, yet still the Ingredients that Compounded it, retaining their own Nature, were by the Destruction of the *Compositum* separable from each other, the minute Parts disingag'd from those of a differing Nature, and associated with those of their own sort returning to be again, Fire, Earth, or Water, as they were before they chanc'd to be Ingredients of that *Compositum*. This may be explain'd (Continues *Eleutherius*,) by a piece of Cloath made of white and black threds interwoven, wherein though the whole piece appear neither white nor black, but of a resulting Colour, that is gray, yet each of the white and black threds that compose it, remains what it was before, as would appear if the threds were pull'd asunder, and sorted each Colour by it self. This (pursues *Eleutherius*) being, as I understand it, the State of the Controversie, and the *Aristotelians* after their Master Commonly Defining, that Mixture is *Miscibilium alteratorum Unio*, that seems to comport much better

better with the Opinion of the Chymists, than with that of their Adversaries, since according to that as the newly mention'd Example declares, there is but a *Juxta*-position of separable Corpuscles, retaining each its own Nature, whereas according to the *Aristotelians*, when what they are pleas'd to call a mixt Body results from the Concourse of the Elements, the *Miscibilia* cannot so properly be said to be Alter'd, as Destroy'd, since there is no Part in the mixt Body, how small soever, that can be call'd either Fire, or Air, or Water, or Earth.

Nor indeed can I well understand, how Bodies can be mingl'd other waies than as I have declar'd, or at least how they can be mingl'd, as our Peripateticks would have it. For whereas *Aristotle* tells us, that if a Drop of Wine be put into ten thousand Measures of Water, the Wine being Overpower'd by so Vast a Quantity of Water will be turn'd into it, he speaks to my Apprehension, very improbably. For though One should add to that Quantity of Water as many Drops of Wine as would a Thousand times exceed it all,
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yet by his Rule the whole Liquor should not be a *Crama*, a Mixture of Wine and Water, , wherein the Wine would be Predominant , but Water only ; Since the Wine being added but by a Drop at a time, would still Fall into nothing but Water, and Consequently would be tur'nd into it. And if this would hold in Metals too, 'twere a rare secret for Goldsmiths, and Refiners; For by melting a Mass of Gold, or Silver, and by but casting into it Lead or Antimony, Grain after Grain, they might at pleasure, within a reasonable Compass of time, turn what Quantity they desire, of the Ignoble into the Noble Metals. And indeed since a Pint of wine, and a Pint of water, amount to about a Quart of Liquor, it seems manifest to sense, that these Bodies doe not Totally Penetrate one another, as one would have it; but that each retains its own Dimensions; and Consequently, that they are by being Mingl'd only divided into minute Bodies, that do but touch one another with their Surfaces, as do the Grains, of Wheat, Rye, Barley, &c. in a heap of severall sorts of Corn : And unless we say, that as
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when one measure of wheat, for Instance, is Blended with a hundred measures of Barley, there happens only a *Juxta*-position and Superficial Contact betwixt the Grains of wheat, and as many or thereabouts of the Grains of Barley; So when a Drop of wine is mingl'd with a great deal of water, there is but an Apposition of so many Vinous Corpuscles to a Correspondent Number of Aqueous ones; Unless I say this be said, I see not how that Absurdity will be avoyded, whereunto the Stoical Notion of *mistion* (namely by *σύγχυσις*, or Confusion) was Liable, according to which the least Body may be co-extended with the greatest: Since in a mixt Body wherein before the Elements were Mingl'd there was, for Instance, but one pound of water to ten thousand of Earth, yet according to them there must not be the least part of that Compound, that Consisted not as well of Earth, as water. But I insist, Perhaps, too long (saies *Eleutherius*) upon the proofs afforded me by the Nature of *Mistion*: Wherefore I will but name Two or Three other Arguments; whereof the first shall be, that

that according to *Aristotle* himself, the motion of a mixt Body followes the Nature of the Predominant Element, as those wherein the Earth prevails, tend towards the Centre of heavy Bodies. And since many things make it Evident, that in divers Mixt Bodies the Elementary Qualities are as well Active, though not altogether so much so as in the Elements themselves, it seems not reasonable to deny the actual Existence of the Elements in those Bodies wherein they Operate.

To which I shall add this Convincing Argument, that Experience manifests, and *Aristotle* Confesses it, that the *Miscibilia* may be again separated from a mixt Body, as is Obvious in the Chymical Resolutions of Plants and Animals, which could not be unless they did actually retain their formes in it: For since, according to *Aristotle*, and I think according to truth, there is but one common Mass of all things, which he has been pleas'd to call *Materia Prima*; And since tis not therefore the Matter but the Forme that Constitutes and Discriminates Things, to say that the Elements remain not in a Mixt Body,

dy, according to their Formes, but according to their Matter, is not to say that they remain there at all; Since although those Portions of Matter were Earth and water, &c. before they concurr'd; yet the resulting Body being once Constituted, may as well be said to be simple as any of the Elements; the Matter being confessedly of the same Nature in all Bodies, and the Elementary Formes being according to this *Hypothesis* perish'd and abolish'd.

And lastly, and if we will Consult Chymical Experiments, we shall find the Advantages of the Chymical Doctrine above the Peripatetick Title little less than Palpable. For in that Operation that Refiners call Quartation, which they employ to purifie Gold, although three parts of Silver be so exquisitely mingl'd by Fusion with a fourth Part of Gold (whence the Operation is Denominated) that the resulting Mass acquires several new Qualities; by vertue of the Composition, and that there is scarce any sensible part of it that is not Compos'd of both the metalls; Yet if You cast this mixture into *Aqua Fortis*; the Silver will be dissolv'd in the
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Menstruum, and the Gold like a dark or black Powder will fall to the Bottom of it, and either Body may be again reduc'd into such a Metal as it was before; which shews, that it retain'd its Nature, notwithstanding its being mixt *per Minima* with the other: We likewise see, that though one part of pure Silver be mingled with eight or ten Parts, or more, of Lead; yet the Fire will upon the Cuppel easily and perfectly separate them again. And that which I would have you peculiarly Consider on this Occasion is, that not only in Chymicall Anatomies there is a Separation made of the Elementary Ingredients, but that some Mixt Bodies afford a very much greater Quantity of this or that Element or Principle, than of another; as we see, that Turpentine and Amber yeeld much more Oyl and Sulphur than they do Water; whereas Wine, which is confess'd to be a perfectly mixt Bodie, yeelds but a little Inflamable Spirit, or Sulphur, and not much more Earth; but affords a vast proportion of Phlegm or water: which could not be, if, as the Peripateticks suppose, every, even of the minutest Particles, were of the same

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Nature with the whole, and consequently did contain both Earth and Water, and Aire, and Fire; Wherefore as to what *Aristotle* principally, and almost only Objects, that unless his Opinion be admitted, there would be no true and perfect Miftion, but onely Aggregates or Heaps of contiguous Corpufcles, which, though the Eye of Man cannot difcerne, yet the Eye of a *Lynx* might perceive not to be of the fame Nature with one another and with their *Totum*, as the Nature of Miftion requires, if he do not beg the Queftion, and make Miftion to confift in what other Naturalifts deny to be requifite to it, yet He at leaft objects That as a great Inconvenience which I cannot take for fuch, till he have brought as Considerable Arguments as I have propos'd to prove the contrary, to evince that Nature makes other Miftions than fuch as I have allowed, wherein the *Miscibilia* are reduc'd into minute Parts, and United as farr as fenfe can difcerne: which if You will not grant to be fufficient for a true Miftion, he muft have the fame Quarrel with Nature her felf, as with his Adverfaries,

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VWherefore (Continues *Eleutherius*) I cannot but somewhat marvel that *Carneades* should oppose the Doctrine of the Chymists in a Particular, wherein they do as well agree with his old Mistress, Nature, as dissent from his old Adversary, *Aristotle*.

I must not (replies *Carneades*) engage my self at present to examine thoroughly the Controversies concerning Miftion: And if there were no third thing, but that I were reduc'd to embrace absolutely and unreservedly either the Opinion of *Aristotle*, or that of the Philosophers that went before him, I should look upon the latter, which the Chymists have adopted, as the more defensible Opinion: But because differing in the Opinions about the Elements from both Parties, I think I can take a middle Course, and Discourse to you of Miftion after a way that does neither perfectly agree, nor perfectly disagree with either, as I will not peremptorily define, whether there be not Cases wherein some *Phænomena* of Miftion seem to favour the Opinion that the Chymists Patrons borrow'd of the Antients, I shall only endeavour to shew You that there

are some cases which may keep the Doubt, which makes up my second General Consideration from being unreasonable.

I shall then freely acknowledge to You (saies *Carneades*) that I am not over-well satisfi'd with the Doctrine that is ascribed to *Aristotle*, concerning Mixture, especially since it teaches that the four Elements may again be separated from the mixt Body; whereas if they continu'd not in it, it would not be so much a Separation as a Production. And I think the Ancient Philosophers that Preceded *Aristotle*, and Chymists who have since receiv'd the same Opinion, do speak of this matter more intelligibly, if not more probably, than the Peripateticks: but though they speak Congruously enough, to their believing, that there are a certain Number of Primogeneal Bodies, by whose Concourse all those we call Mixt are Generated, and which in the Destruction of mixt Bodies do barely part company, and reduce from one another, just such as they were when they came together; yet I, who meet with very few Opinions that I can entirely Acquiesce in, must

must confess to You that I am inclin'd to differ not only from the *Aristotelians*, but from the old Philosophers and the Chymists, about the Nature of Miftion: And if You will give me leave, I shall Briefly propose to you my present Notion of it, provided you will look upon it, not so much as an Assertion as an *Hypothesis*; in talking of which I do not now pretend to propose and debate the whole Doctrine of Miftion; but to shew that 'tis not Improbable, that sometimes mingl'd substances may be so strictly united, that it doth not by the usuall Operations of the Fire, by which Chymists are wont to suppose themselves to have made the *Analysis* of mixt Bodies, sufficiently appear, that in such Bodies the *Miscibilia*, that concurr'd to make them up, do each of them retain its own peculiar Nature: and by the *Spagyrist's* Fires may be more easily extricated and Recover'd, than Alter'd, either by a Change of Texture in the Parts of the same Ingredient, or by an Association with some parts of another Ingredient more strict than was that of the parts of this or that *Miscibile* among themselves. At these words *Eleu.*

having press'd him to do what he propos'd, & promis'd to do what he desir'd;

I consider then (resumes *Carneades*) that, not to mention those improper Kinds of Miftion, wherein *Homogeneous* Bodies are Joyn'd, as when Water is mingl'd with water, or two Vessels full of the same kind of Wine with one another, the miftion I am now to discourse of seems, Generally speaking, to be but an Union *per Minima* of any two or more Bodies of differing Denominations; as when Ashes and Sand are Colliquated into Glafs; or Antimony and Iron into *Regulus Martis*; or Wine and Water are mingl'd, and Sugar is dissolv'd in the Mixture. Now in this general notion of Miftion it does not appear clearly comprehended, that the *Miscibilia* or Ingredients do in their small Parts so retain their Nature and remain distinct in the Compound, that they may thence by the Fire be again taken asunder: For though I deny not that in some Miftions of certain permanent Bodies this Recovery of the same Ingredients may be made; yet I am not convinc'd that it will hold in all or even in most, or that it is necessarily deducible from Chymicall

micall Experiments, and the true Notion of Miftion. To explain this a little, I affume, that Bodies may be mingl'd, and that very durably, that are not Elementary, nor have been resolv'd into Elements or Principles, that they may be mingl'd; as is evident in the *Regulus* of Colliquated Antimony, and Iron newly mention'd; and in Gold Coyne, which lafts fo many ages; wherein generally the Gold is alloy'd by the mixture of a quantity, greater or leffer, (in our Mints they ufe about a 12th. part) of either filver, or Copper, or both. Next, I confider, that there being but one Univerfal matter of things, as 'tis known that the *Aristotelians* themselves acknowledge, who call it *Materia Prima* (about which nevertheless I like not all their Opinions) the Portions of this matter feem to differ from One Another, but in certain Qualities or Accidents, fewer or more; upon whose Account the Corporeal Substance they belong to receives its Denomination, and is referr'd to this or that particular fort of Bodies; fo that if it come to lofe, or be depriv'd of thofe Qualities, though it ceases not to be a Body, yet it ceases

from being that kind of Body as a Plant, or Animal, or Red, Green, Sweet, Sowre, or the like. I consider that it very often happens that the small parts of Bodies cohere together but by immediate Contact and Rest, and that however, there are few Bodies whose minute Parts stick so close together, to what cause soever their Combination be ascrib'd, but that it is possible to meet with some other Body, whose small Parts may get between them, and so dis-joyn them; or may be fitted to cohere more strongly with some of them, than those some do with the rest; or at least may be combin'd so closely with them, as that neither the Fire, nor the other usual Instruments of Chymical Anatomies will separate them. These things being premis'd, I will not peremptorily deny, but that there may be some Clusters of Particles, wherein the Particles are so minute, and the Coherence so strict, or both, that when Bodies of Differing Denominations, and consisting of such durable Clusters, happen to be mingl'd, though the Compound Body made up of them may be very Differing from either of
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the Ingredients, yet each of the little Masses or Clusters may so retain its own Nature, as to be again separable, such as it was before. As when Gold and Silver being melted together in a Due Proportion (for in every Proportion, the Refiners will tell You that the Experiment will not succeed) *Aqua Fortis* will dissolve the Silver, and leave the Gold untoucht; by which means, as you lately noted, both the Metalls may be recover'd from the mixed Mass. But (Continues *Carneades*) there are other Clusters wherein the Particles stick not so close together, but that they may meet with Corpuscles of another Denomination, which are dispos'd to be more closely United with some of them, than they were among themselves. And in such case, two thus combining Corpuscles losing that Shape, or Size, or Motion, or other Accident, upon whose Account they were endow'd with such a Determinate Quality or Nature, each of them really ceases to be a Corpuscle of the same Denomination it was before; and from the Coalition of these there may emerge a new Body, as really one, as either of the Corpuscles was before they

they were mingl'd, or , if you please, Confounded: Since this Concretion is really endow'd with its own Distinct qualities, and can no more by the Fire, or any other known way of *Analysis*, be divided again into the Corpuscles that at first concurr'd to make it, than either of them could by the same means be subdivided into other Particles. But (saies *Eleutherius*) to make this more intelligible by particular examples; If you dissolve Copper in *Aqua Fortis*, or Spirit of Nitre, (for I remember not which I us'd, nor do I think it much Material) You may by Chrystalizing the Solution Obtain a goodly Vitriol; which though by Vertue of the Composition it have manifestly diverse Qualities, not to be met with in either of the Ingredients, yet it seems that the Nitrous Spirits, or at least many of them, may in this Compounded Mass retain their former Nature; for having for tryal sake Distill'd this Vitriol Spirit, there came over store of Red Fumes, which by that Colour, by their peculiar stinke, and by their Sowness, manifested themselves to be, Nitrous Spirits; and that the remaining Calx continu'd Copper,

I suppose you'l easily beleieve. But if you dissolve *Minium*, which is but Lead Powder'd by the Fire, in good Spirit of Vinegar, and Chrystalize the Solution, you shall not only have a Saccharine Salt exceedingly differing from both its Ingredients; but the Union of some Parts of the *Menstruum* with some of those of the Metal is so strict, that the Spirit of Vinegar seems to be, as such, destroy'd; since the Saline Corpuscles have quite lost that acidity, upon whose Account the Liquor was call'd Spirit of Vinegar; nor can any such Acid Parts as were put to the *Minium* be Separated by any known way from the *Saccharum Saturni* resulting from them both; for not only there is no Sourness at all, but an admirable Sweetness to be tasted in the Concretion; and not only I found not that Spirit of Wine, which otherwise will immediately hiss when mingl'd with strong Spirit of Vinegar, would hiss being pour'd upon *Saccharum Saturni*, wherein yet the Acid Salt of Vinegar, did it Survive, may seem to be concentrated; but upon the Distillation of *Saccharum Saturni* by it Self I found indeed a Liquor very Penetrant

netrant, but not at all Acid, and differing as well in smell and other Qualities, as in taste, from the Spirit of Vinegar; which likewise seem'd to have left some of its Parts very firmly united to the *Caput Mortuum*, which though of a Leaden Nature was in smell, Colour, &c. differing from *Minium*; which brings into my mind, that though two Powders, the one Blew, and the other Yellow, may appear a Green mixture, without either of them losing its own Colour, as a good Microscope has sometimes inform'd me; yet having mingl'd *Minium* and *Sal Armoniack* in a requisite Proportion, and expos'd them in a Glass Vessel to the Fire, the whole Mass became White, and the Red Corpuscles were destroy'd; for though the Calcin'd Lead was separable from the Salt, yet you'll easily beleeve it did not part from it in the Forme of a Red Powder, such as was the *Minium*, when it was put to the *Sal Armoniack*. I leave it also to be consider'd, whether in Blood, and divers other Bodies, it be probable, that each of the Corpuscles that concurr to make a Compound Body doth, though some of them in
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some Cases may, retain its own Nature in it, so that Chymists may Extricate each sort of them from all the others, wherewith it concurr'd to make a Body of one Denomination.

I know there may be a Distinction betwixt Matter *Immanent*, when the material Parts remain and retain their own Nature in the things materiated, as some of the Schoolmen speak, (in which sence Wood, Stones and Lime are the matter of a House,) and *Transient*, which in the materiated thing is so alter'd, as to receive a new Forme, without being capable of re-admitting again the Old. In which sence the Friends of this Distinction say, that *Chyle* is the matter of Blood, and Blood that of a Humane Body, of all whose Parts 'tis presum'd to be the Aliment. I know also that it may be said, that of material Principles, some are *Common* to all mixt Bodies, as *Aristotles* four Elements, or the Chymists *Tria Prima*; others *Peculiar*, which belong to this or that sort of Bodies; as Butter and a kind of whey may be said to be the Proper Principles of Cream: and I deny not, but that these Distinctions may in some Cases be

be of Use ; but partly by what I have said already, and partly by what I am to say, You may easily enough guess in what sence I admit them, and discern that in such a sence they will either illustrate some of my Opinions, or at least will not overthrow any of them.

To prosecute then what I was saying before, I will add to this purpose, That since the Major part of Chymists Credit, what those they call Philosophers affirme of their Stone, I may represent to them, that though when Common Gold and Lead are mingled Together, the Lead may be sever'd almost un-alter'd from the Gold; yet if instead of Gold a *Tantillum* of the Red *Elixir* be mingled with the Saturn, their Union will be so indissoluble in the perfect Gold that will be produc'd by it, that there is no known, nor perhaps no possible way of separating the diffus'd *Elixir* from the fixed Lead, but they both Constitute a most permanent Body, wherein the Saturn seems to have quite lost its Properties that made it be call'd Lead, and to have been rather transmuted by the *Elixir*, than barely associated to it. So that it seems not always

waies necessary, that the Bodies that are put together *per minima*, should each retain its own Nature; So as when the Mass it Self is dissipated by the Fire, to be more dispos'd to re-appear in its Pristine Forme, than in any new one, which by a stricter association of its Parts with those of some of the other Ingredients of the *Compositum*, than with one another, it may have acquired.

And if it be objected, that unless the *Hypothesis* I oppose be admitted, in such Cases as I have proposed, there would not be an Union, but a Destruction of mingled Bodies, which seems all one as to say, that of such Bodies there is no mixture at all; I answer, that though the Substances that are mingl'd remain, only their Accidents are Destroy'd, and though we may with tolerable Congruity call them *Miscibilia*, because they are Distinct Bodies before they are put together, however afterwards they are so Confounded that I should rather call them Concretions, or Resulting Bodies, than mixt ones; and though, perhaps some other and better Account may be propos'd, upon which the name
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of miftion may remain ; yet if what I have faid be thought Reason, I fhall not wrangle about words, though I think it fitter to alter a Terme of Art, than reject a new Truth ; becaufe it fuits not with it. If it be alfo Objected that this Notion of mine, concerning miftion ; though it may be allow'd, when Bodies already Compounded are put to be mingl'd, yet it is not applicable to thofe miftions that are immediately made of the Elements, or Principles themfelves ; I Answer in the firft place, that I here Confider the Nature of miftion somewhat more Generally, than the Chymifts ; who yet cannot deny that there are oftentimes Mixtures, and thofe very durable ones, made of Bodies that are not Elementary. And in the next place, that though it may be probably pretended that in thofe Mixtures that are made immediately of the Bodies, that are call'd Principles or Elements, the mingl'd Ingredients may better retain their own Nature in the Compounded Mafs, and be more eafily feparated from thence ; yet, befides that It may be doubted, whether there be any fuch Primary Bodies, I fee not why the
reason

reason I alledg'd, of the destructibility of the Ingredients of Bodies in General, may not sometimes be Applicable to Salt, Sulphur, or Mercury; 'till it be shewn upon what account we are to believe them Priviledged. And however, (if you please but to recall to mind, to what purpose I told you at First, I meant to speak of Miftion at this Time) you will perhaps allow, that what I have hitherto Discoursed about it, may not only give some Light to the Nature of it in general, (especially when I shall have an Opportunity to Declare to you my thoughts on that subject more fully) but may on some Occasions also be Serviceable to me in the Insuing Part of this Discourse.

But to look back now to that part of our Discourse, whence this Excursion concerning Miftion has so long diverted us, though we there Deduc'd, from the differing Substances obtained from a Plant nourished only with Water, and from some other things, that it was not necessary that nature should alwaies compound a Body at first of all such differing bodies as the fire could afterwards make it afford; yet this is not all

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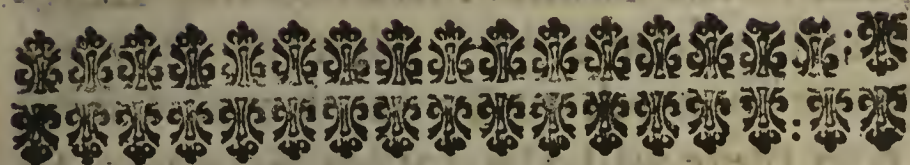
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that may be collected from those Experiments. For from them there seems also Deducible something that Subverts an other Foundation of the Chymical Doctrine. For since that (as we have seen) out of fair Water alone, not only Spirit, but Oyle, and Salt, and Earth may be Produced; It will follow that Salt and Sulphur are not Primogeneal Bodies, and principles, since they are every Day made out of plain Water by the Texture which the Seed or Seminal principle of plants put it into. And this would not perhaps seem so strange, if through pride or negligence, We were not Wont to Overlook the Obvious and Familiar Workings of Nature; For if We consider what slight Qualities they are that serve to denominate one of the *Tria Prima*, We shall find that Nature do's frequently enough work as great Alterations in divers parcells of matter: For to be readily dissoluble in water, is enough to make the body that is so, pass for a Salt. And yet I see not why from a new shuffling and Disposition of the Component Particles of a body, it should be much harder for Nature to compose a body dissoluble in Water

Water, of a portion of Water that was not so before, than of the Liquid substance of an Egg, which will easily mix with Water, to produce by the bare warmth of a hatching Hen, Membrans, Feathers, Tendons, and other parts, that are not dissoluble in Water as that Liquid Substance was: Nor is the Hardness and Brittleness of Salt more difficult for Nature to introduce into such a yeelding body as Water, than it is for her to make the Bones of a Chick out of the tender Substance of the Liquors of an Egg. But instead of prosecuting this consideration, as I easily might, I will proceed, as soon as I have taken notice of an objection that lies in my way. For I easily foresee it will be alledged, that the above mentioned Examples are all taken from Plants, and Animals, in whom the Matter is Fashioned by the Plastick power of the seed, or something analogous thereunto. Whereas the Fire do's not act like any of the Seminal Principles, but destroyes them all when they come within its Reach. But to this I shall need at present to make but this easy Answer, That whether it be a Seminal Principle, or any other which

fashions that Matter after those various manners I have mentioned to You, yet 'tis Evident, that either by the Plastick principle Alone, or that and Heat Together, or by some Other cause capable to conrex the matter, it is yet possible that the matter may be Anew contriv'd into such Bodies. And 'tis only for the Possibility of this that I am now contending.

The



T H E

SCEPTICAL CHYMIST

The Third Part.

WHat I have hitherto Discours'd,
Eleutherius, (saies his Friend to
 Him) has, I presume, shew'n You, that
 a Considering Man may very well
 question the Truth of those very Sup-
 positions which Chymists as well as
 Peripatericks, without proving, take for
 granted; and upon which Depends the
 Validity of the Inferences they draw
 from their Experiments. Wherefore
 having dispatch'd that, which though a
 Chymist Perhaps will not, yet I do,
 look upon as the most Important, as
 well as Difficult, part of my Task, it
 will now be Seasonable for me to pro-

ceed to the Consideration of the Experiments themselves, wherein they are wont so much to Triumph and Glory. And these will the rather deserve a serious Examination, because those that Alledge them are wont to do it with so much Confidence and Ostentation, that they have hitherto impos'd upon almost all Persons, without excepting Philosophers and Physicians themselves, who have read their Books, or heard them talk. For some learned Men have been content rather to beleeve what they so boldly Affirme, than be at the trouble and charge, to try whether or no it be True. Others again, who have Curiosity enough to Examine the Truth of what is Averr'd, want Skill and Opportunity to do what they Desire. And the Generality even of Learned Men, seeing the Chymists (not contenting themselves with the Schools to amuse the World with empty words) Actually Perform divers strange things, and, among those Resolve Compound Bodies into several Substances not known by former Philosophers to be contain'd in them: Men I say, seeing these Things, and
Hearing

Hearing with what Confidence Chymists Averr the Substances Obtain'd from Compound Bodies by the Fire to be the True Elements, or, (as they speak) Hypostatical Principles of them, are forward to think it but Just as well as Modest, that according to the *Logicians* Rule, the Skilfull *Artists* should be Credited in their own Art; Especially when those things whose Nature they so Confidently take upon them to teach others, are not only Productions of their own Skill, but such as others Know not else what to make of.

But though (Continues *Carneades*) the Chymists have been able upon some or other of the mention'd Accounts, not only to Delight but Amaze, and almost to bewitch even Learned Men; yet such as You and I, who are not unpractis'd in the Trade, must not suffer our Selves to be impos'd upon by hard Names, or bold Assertions; nor to be dazl'd by that Light which should but assist us to discern things the more clearly. It is one thing to be able to help Nature to produce things, and another thing to Understand well the Nature

of the things produc'd. As we see, that many Persons that can beget Children, are for all that as Ignorant of the Number and Nature of the parts, especially the internal ones, that Constitute a Childs Body, as they that never were Parents. Nor do I Doubt, but you'll excuse me, if as I thank the Chymists for the things their *Analysis* shews me, so I take the Liberty to consider how many, and what they are, without being astonish'd at them; as if, whosoever hath Skill enough to shew men some new thing of his own making, had the Right to make them beleieve whatsoever he pleases to tell them concerning it.

Wherefore I will now proceed to my Third General Consideration, which is, That it does not appear, that *Three* is precisely and Universally the Number of the Distinct Substances or Elements, whereinto mixt Bodies are resolvable by the Fire, I mean that 'tis not prov'd by Chymists, that all the Compound Bodies, which are granted to be perfectly mixt, are upon their Chymical *Analysis* divisible each of them into just Three Distinct Substances, neither

ther more nor less, which are wont to be lookt upon as Elementary, or may as well be reputed so as those that are so reputed. Which last Clause I subjoyne, to prevent your Objecting that some of the Substances I may have occasion to mention by and by, are not perfectly Homogeneous, nor Consequently worthy of the name of Principles. For that which I am now to consider, is, into how many Differing Substances, that may plausibly pass for the Elementary Ingredients of a mix'd Body, it may be Analyz'd by the Fire; but whether each of these be un-compounded, I reserve to examine, when I shall come to the next General Consideration; where I hope to evince, that the Substances which the Chymists not only allow, but assert to be the Component Principles of the Body resolv'd into them, are not wont to be un-compounded.

Now there are two Kind of Arguments (pursues *Carneades*) which may be brought to make my Third Proposition seem probable; one sort of them being of a more Speculative Nature, and the other drawn from Experience.

fience. To begin then with the first of these:

But as *Carneades* was going to do as he had said, *Eleutherius* interrupted him, by saying with a somewhat smiling countenance;

If you have no mind I should think, that the Proverb, *That Good Wits have bad Memories*, is Rational and Applicable to You, You must not Forget now you are upon the Speculative Considerations, that may relate to the Number of the Elements; that your Self did not long since Deliver and Concede some Propositions in Favour of the Chymical Doctrine, which I may without disparagement to you think it uneasy, even for *Carneades* to answer.

I have not, replies he, Forgot the Concessions you mean; but I hope too, that you have not forgot neither with what Cautions they were made, when I had not yet assumed the Person I am now sustaining. But however, I shall to content You, so discourse of my Third general consideration, as to let You see, That I am not Unmindful of the things you would have me remember.

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To talk then again according to such principles as I then made use of, I shall represent, that if it be granted rational to suppose, as I then did, that the Elements consisted at first of certain small and primary Coalitions of the minute Particles of matter into Corpuscles very numerous, and very like each other, It will not be absur'd to conceive, that such primary Clusters may be of far more sorts than three or five; and consequently, that we need not suppose, that in each of the compound Bodies we are treating of, there should be found just three sorts of such primitive Coalitions, as we are speaking of.

And if according to this Notion we allow a considerable number of differing Elements, I may add, that it seems very possible, that to the constitution of one sort of mixt Bodies two kinds of Elementary ones may suffice (as I lately Exemplify'd to you, in that most durable Concrete, Glass,) another sort of Mixts may be compos'd of three Elements, another of four, another of five, and another perhaps of many more. So that according to this Notion, there can be no determinate number assign'd, as
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that of the Elements, of all sorts of compound Bodies whatsoever, it being very probable that some Concretes consist of fewer, some of more Elements. Nay, it does not seem Impossible, according to these Principles, but that there may be two sorts of Mixts; whereof the one may not have any of all the same Elements as the other consists of; as we oftentimes see two words, whereof the one has not any one of the Letters to be met with in the other; or as we often meet with diverse Electuaries, in which no Ingredient (except Sugar) is common to any two of them. I will not here debate whether there may not be a multitude of these Corpuscles, which by reason of their being primary and simple, might be called Elementary, if several sorts of them should convene to compose any Body, which are as yet free, and neither as yet contex'd & entangl'd with primary Corpuscles of other kinds, but remains liable to be subdu'd and fashion'd by Seminal Principles, or the like powerful and Transmuting Agent, by whom they may be so connected among themselves, or with the parts of one of the bodies, as to make the compound

pound Bodies, whose Ingredients they are, resolvable into more, or other Elements than those that Chymists have hitherto taken notice of.

To all which I may add, that since it appears, by what I observ'd to you of the permanency of Gold and Silver, that even Corpuscles that are not of an Elementary but compounded Nature, may be of so durable a Texture, as to remain indissoluble in the ordinary *Analysis* that Chymists make of Bodies by the Fire; 'Tis not impossible but that, though there were but three Elements, yet there may be a greater number of Bodies, which the wonted waies of Anatomy will not discover to be no Elementary Bodies.

But, (saies *Carneades*) having thus far, in compliance to you, talk't conjecturally of the number of the Elements, 'tis now time to consider, not of how many Elements it is possible that Nature may compound mix'd Bodies, but (at least as farr as the ordinary Experiments of Chymists will informe us) of how many she doth make them up.

I say then, that it does not by these sufficiently appear to me, that there is
any

any one determinate Number of Elements to be uniformly met with in all the several sorts of Bodies allow'd to be perfectly mixt.

And for the more distinct proof of this Proposition, I shall in the first place Represent, That there are divers Bodies, which I could never see by fire divided into so many as three Elementary substances. I would fain (as I said lately to *Philoponus*) see that fixt and noble Metal we call Gold separated into Salt, Sulphur and Mercury: and if any man will submit to a competent forfeiture in case of failing, I shall willingly in case of prosperous successe pay for both the Materials and the charges of such an Experiment. 'Tis not, that after what I have try'd my self I dare peremptorily deny, that there may out of Gold be extracted a certain substance, which I cannot hinder Chymists from calling its Tincture or Sulphur; and which leaves the remaining Body depriv'd of its wonted colour. Nor am I sure, that there cannot be drawn out of the same Metal a real quick and running Mercury. But for the Salt of Gold, I never could either see it, or be satisfied that there was ever such a thing separated,

separated, *in rerum natura*, by the relation of any credible eye witnesses. And for the several Processes that Promise that effect, the materials that must be wrought upon are somewhat too precious and costly to be wasted upon so groundlesse adventures, of which not only the success is doubtful, but the very possibility is not yet demonstrated. Yet that which most deterrs me from such tryalls, is not their chargeableness, but their unsatisfactorinesse, though they should succeed. For the Extraction of this golden Salt being in Chymists Processes prescribed to be effected by corrosive *Mens-truums*, or the Intervention of other Saline Bodies, it will remain doubtfull to a wary person, whether the Emergent Salt be that of the Gold it self; or of the Saline Bodies or Spirits employ'd to prepare it; For that such disguises of Metals do often impose upon Artists, I am sure *Eleutherius* is not so much a stranger to Chymistry as to ignore. I would likewise willingly see the three principles separated from the pure sort of Virgin-Sand, from *Osteocalla*, from refined Silver, from Quicksilver, freed from its adventitious Sulphur, from *Venetian* Talck,

Talck, which by long detention in an extreme *Reverberium*, I could but divide into smaller Particles, not the constituent principles; Nay, which, when I caused it to be kept, I know not how long, in a Glafs-house fire, came out in the Figure it's Lumps had when put in, though alter'd to an almost *Amethystine* colour; and from divers other Bodies, which it were now unnecessary to enumerate. For though I dare not absolutely affirm it to be impossible to Analyze these Bodies into their *Tria Prima*; yet because, neither my own Experiments, nor any competent Testimony hath hitherto either taught me how such an *Analysis* may be made, or satisfy'd me, that it hath been so, I must take the Liberty to refrain from beleiving it, till the Chymists prove it, or give us intelligible and practicable Processes to perform what they pretend. For whilst they affect that *Ænigmatical* obscurity with which they are wont to puzzle the Readers of their divulg'd Processes concerning the Analytical Preparation of Gold or Mercury, they leave wary persons much unsatisfy'd whether or no the differing Substances, they promise to produce, be truly

ly the Hypostatical Principles, or only some intermixtures of the divided Bodies with those employ'd to work upon them, as is Evident in the seeming Chrystalls of Silver, and those of Mercury; which though by some inconsiderately supposed to be the Salts of those Metalls, are plainly but mixtures of the Metalline Bodies, with the Saline parts of *Aqua Fortis* or other corrosive Liquors; as is evident by their being reducible into Silver or Quicksilver, as they were before.

I cannot but Confess (saith *Eleutherius*) that though Chymists may upon probable grounds affirme themselves Able to obtain their *Tria Prima*, from Animals and Vegetables, yet I have often wondred that they should so confidently pretend also to resolve all Metalline and other Mineral bodies into Salt, Sulphur, and Mercury. For 'tis a saying almost Proverbial, among those Chymists themselves that are accounted Philosophers; and our famous Countryman *Roger Bacon* has particularly adopted it; that, *Facilius est aurum facere, quam destruere*. And I fear, with You, that Gold is not the only Mineral from which Chymists

N

mists are wont fruitlessly to attempt the separating of their three Principles. I know indeed (continues *Eleutherius*) that the Learned *Sennertus*, even in that book where he takes not upon him to play the Advocate for the Chymists, but the Umpier betwixt them and the Peripateticks, exprest himself roundly, thus; *Salem omnibus inesse (mixtis scilicet) & ex iis fieri posse omnibus in resolutionibus Chymicis versatis notissimum est.* And in the next Page, *Quod de sale dixi*, saies he, *Idem de Sulphure dici potest*: but by his favour I must see very good proofs, before I beleieve such general Assertions, how boldly soever made; and he that would convince me of their truth, must first teach me some true and practicable way of separating Salt and Sulphur from Gold, Silver, and those many different sorts of Stones, that a violent Fire does not bring to Lime, but to Fusion; and not only I, for my own part, never saw any of those newly nam'd Bodies so resolved; but *Helmont*, who was much better vers'd in the Chymical Anatomizing of Bodies than either *Sennertus* or I, has somewhere this resolute passage;

Sennert.
lib. de
conf. &
dissens.
pag. 147.

Helmont.
pag. 409.

Scio (saies he) *ex arena, silicibus & saxis,*

non

non Calcaris, numquam Sulphur aut Mercurium trahi posse; Nay Quercetanus himself, though the grand stickler for the *Tria Prima*, has this Confession of the Irresolubleness of Diamonds; *Adamas* Quercet (saith he) *omnium factus Lapidum solidissimus ac durissimus ex arctissima videlicet trium principiorum unione ac Cohærentia, quæ nulla arte separationis in solutionem principiorum suorum spiritualium disjungi potest.* And indeed, pursues *Eleutherius*, I was not only glad but somewhat surprized to find you inclined to Admit that there may be a Sulphur and a running Mercury drawn from Gold; for unless you do (as your expression seem'd to intimate) take the word Sulphur in a very loose sence, I must doubt whether our Chymists can separate a Sulphur from Gold: For when I saw you make the experiment that I suppose invited you to speak as you did, I did not judge the golden Tincture to be the true principle of Sulphur extracted from the Body, but an aggregate of some such highly colour'd parts of the Gold, as a Chymist would have called a *Sulphur incombustible*, which in plain English seems to be little better than to call it a Sulphur &

Quercet
apud Bil-
lich. in
Theffalo
redivivo.
pag. 99

no Sulphur. And as for Metalline Mercuries, I had not wondred at it, though you had exprest much more severity in speaking of them: For I remember that having once met an old and famous Artist, who had long been (and still is) Chymist to a great Monarch, the repute he had of a very honest man invited me to desire him to tell me ingenuously whether or no among his many labours, he had ever really extracted a true and running Mercury out of Metalls; to which question he freely replyed, that he had never separated a true Mercury from any Metal; nor had ever seen it really done by any man else. And though Gold is, of all Metalls, That, whose Mercury Chymists have most endeavoured to extract, and which they do the most brag they have extracted; yet the Experienced *Angelus Sala*, in his *Spagyricall* account of the seven *Terrestrial* Planets (that is the seven metalls) affords us this memorable Testimony, to our present purpose; *Quaquam* (saies he) &c. *experientia tamen (quam stultorum Magistrum vocamus) certe Comprobavit, Mercurium auri adeo fixum, maturum; & arcte cum reliquis ejusdem corporis substantiis conjungi,*

conjugi, ut nullo modo retrogredi possit.
 To which he sub-joynes that he himself
 had seen much Labour spent upon that
 Design, but could never see any such
 Mercury produc'd thereby. And I easily
 beleieve what he annexes; *that he had of-*
ten seen Detected many tricks and Impo-
stures of Cheating Alchymists : For, the
 most part of thole that are fond of such
Charlatans, being unskilful or Creden-
 tious, or both, 'tis very easie for such as
 have some Skill, much craft, more bold-
 ness, and no Conscience, to impose upon
 them; and therefore, though many pro-
 fes'd *Alchymists*, and divers Persons of
 Quality have told me that they have
 made or seen the Mercury of Gold, or of
 this or that other Metal; yet I have been
 still apt to fear that either these persons
 have had a Design to deceive others; or
 have had not Skill and circumspection
 enough to keep themselves from being
 deceived.

You recall to my mind (saies *Carne-*
ades) a certain Experiment I once de-
 vis'd, innocently to deceive some per-
 sons and let them and others see how
 little is to be built upon the affirma-
 tion of those that are either unskilfull

or unwary, when they tell us they have seen *Alchymists* make the Mercury of this or that Metal; and to make this the more evident, I made my Experiment much more Slight, Short and Simple, than the *Chymists* usuall processes to Extract Metalline Mercuries; which Operations being commonly more Elaborate and Intricate, and requiring a much more longer time, give the *Alchymists* a greater opportunity to Cozen, and Consequently are more Obnoxious to the Spectators suspicion. And that wherein I endeavour'd to make my Experiment look the more like a True *Analysis*, was, that I not only pretended as well as others to extract a Mercury from the Metal I wrought upon, but likewise to separate a large proportion of manifest and inflammable Sulphur. I take then, of the filings of Copper, about a Drachme or two; of common sublimate, powder'd, the like Weight; and *Sal Armoniack* near about as much as of Sublimate; these three being well mingl'd together I put into a small Vial with a long neck, or, which I find better, into a Glass Urinall, which (having first stopp'd it with Cotton) to avoid the

the Noxious Fumes, I approach by degrees to a competent Fire of well kindled coals, or (which looks better, but more endangers the Glass) to the Flame of a candle ; and after a while the bottom of the Glass being held Just upon the Kindled Coals, or in the flame, You may in about a quarter of an Hour, or perchance in halfe that time, perceive in the Bottom of the Glass some running Mercury ; and if then You take away the Glass and break it, You shall find a Parcel of Quicksilver, Perhaps altogether, and perhaps part of it in the pores of the Solid Mass ; You shall find too, that the remaining Lump being held to the Flame of the Candle will readily burn with a greenish Flame, and after a little while (perchance presently) will in the Air Acquire a Greenish Blew, which being the Colour that is ascrib'd to Copper, when its Body is unlocked, 'Tis easie to perswade Men that this is the True Sulphur of *Venus*, especially since not only the Salts may be Suppos'd partly to be Flown away, and partly to be Sublim'd to the upper part of the Glass, whose inside (will

Commonly appear Whitened by them) but the Metal seems to be quite Destroy'd, the Copper no longer appearing in a Metalline Forme, but almost in that of a Resinous Lump; whereas indeed the Case is only this, That the Saline parts of the Sublimate together with the *Sal Armoniack*, being excited and actuated by the Vehement heat, fall upon the Copper, (which is a Metal they can more easily corrode, than Silver) whereby the small parts of the Mercury being freed from the Salts that kept them asunder, and being by the heat tumbled up and down after many Occursions, they Convene into a Conspicuous Mass of Liquor; and as for the Salts, some of the more Volatile of them Subliming to the upper part of the Glass, the others Corrode the Copper, and uniting themselves with it do strangely alter and Disguise its Metallick Form, and compose with it a new kind of Concrete inflamable like Sulphur; concerning which I shall not now say any thing, since I can Referr You to the Diligent Observations which I remember Mr. Boyle has made concerning this Odde kind of Verdigrease, But Con-

tinues

tinues *Carneades* smiling, you know I was not cut out for a Mountebank, and therefore I will hasten to resume the person of a Sceptick, and take up my discourse where You diverted me from prosecuting it.

In the next place, then, I consider, that, as there are some Bodies which yeeld not so many as the three Principles; so there are many others, that in their Resolution Exhibite more principles than three; and that therefore the Ternary number is not that of the Universal and Adequate Principles of Bodies. If you allow of the Discourse I lately made You, touching the primary Associations of the small Particles of matter, You will scarce think it improbable, that of such Elementary Corpuscles there may be more sorts than either three, or four, or five. And if you will grant, what will scarce be deny'd, that Corpuscles of a compounded Nature may in all the wonted Examples of Chymists pass for Elementary, I see not why you should think it impossible, that as *Aqua Fortis*, or *Aqua Regis* will make a Separation of colliquated Silver and Gold, though the Fire cannot; so there
may

may be some Agent found out so subtile and so powerfull, at least in respect of those particular compounded Corpuscles, as to be able to resolve them into those more simple ones, whereof they consist, and consequently encrease the number of the Distinct Substances, whereinto the mixt Body has been hitherto thought resolvable. And if that be true, which I recited to you a while ago out of *Helmont* concerning the Operations of the *Alkabeft*, which divides Bodies into other Distinct Substances, both as to number and Nature, than the Fire does; it will not a little countenance my Conjecture. But confining our selves to such waies of Analyzing mix'd Bodies, as are already not unknown to Chymists, it may without Absurdity be Question'd, whether besides those grosser Elements of Bodies, which they call Salt Sulphur and Mercury, there may not be Ingredients of a more Subtile Nature, which being extreamly little, and not being in themselves Visible, may escape unheeded at the Junctures of the Destillatory Vessels, though never so carefully Luted. For let me observe to you one thing, which though
not

not taken notice of by Chymists, may be a notion of good use in divers Cases to a Naturalist, that we may well suspect, that there may be severall Sorts of Bodies, which are not Immediate Objects of any one of our senses; since we See, that not only those little Corpuscles that issue out of the Loadstone, and perform the Wonders for which it is justly admired; But the *effluvia* of Amber, Jet, and other Electricall Concretes, though by their effects upon the particular Bodies dispos'd to receive their Action, they seem to fall under the Cognizance of our Sight, yet do they not as Electrical immediately Affect any of our senses, as do the bodies, whether minute or greater, that we See, Feel, Taste, &c. But, (Continues *Carneades*) because you may expect I should, as the Chymists do, consider only the sensible Ingredients of Mixt Bodies, let us now see, what Experience will, even as to these, suggest to us.

It seems then questionable enough, whether from Grapes variously order'd there may not be drawn more distinct Substances by the help of the Fire, than from most other mixt Bodies. For the
Grapes

Grapes themselves being dried into Raisins and distill'd, will (besides *Alkali*, Phlegm, and Earth) yeeld a considerable quantity of an Empyreumatical Oyle, and a Spirit of a very different nature from that of Wine. Also the unfermented Juice of Grapes affords other distill'd Liquors than Wine doth. The Juice of Grapes after fermentation will yeeld a *Spiritus Ardens*; which if competently rectified will all burn away without leaving any thing remaining. The same fermented Juice degenerating into Vinegar, yeelds an acid and corroding Spirit. The same Juice tunn'd up, armes it self with Tartar; out of which may be separated, as out of other Bodies, Phlegme, Spirit, Oyle, Salt and Earth: not to mention what Substances may be drawn from the Vine it selfe, probably differing from those which are separated from Tartar, which is a body by it self, that has few resemblers in the World. And I will further consider that what force soever you will allow this instance, to evince that there are some Bodies that yeeld more Elements than others, it can scarce be deny'd but that the Major part of bodies that are divisible
into

into Elements yeeld more than three. For, besides those which the Chymists are pleased to name Hypostatical, most bodies contain two others; Phlegme and Earth, which concurring as well as the rest to the constitution of Mixts, and being as generally, if not more, found in their *Analysis*, I see no sufficient cause why they should be excluded from the number of Elements. Nor will it suffice to object, as the *Paracelsians* are wont to do, that the *Tria prima* are the most useful Elements, and the Earth and Water but worthless and unactive; for Elements being call'd so in relation to the constituting of mixt Bodies, it should be upon the account of its Ingrediency, not of its use, that any thing should be affirmed or denyed to be an Element: and as for the pretended useflessness of Earth and Water, it would be consider'd that usefulness, or the want of it, denotes only a Respect or Relation to us; and therefore the presence, or absence of it, alters not the Intrinsic nature of the thing. The hurtful Teeth of Vipers are for ought I know usefless to us, and yet are not to be deny'd to be parts of their Bodies; and it were hard to shew of
what

what greater Use to Us, than Phlegme and Earth, are those Undiscern'd Stars, which our New *Telescopes* discover to Us, in many Blanched places of the Sky; and yet we cannot but acknowledge them Constituent and Considerably great parts of the Universe. Besides that whether or no the Phlegm and Earth be immediately Useful, but necessary to constitute the Body whence they are separated; and consequently, if the mixt Body be not Useless to us, those constituent parts, without which it could not have been That mixt Body, may be said not to be Unuseful to Us: and though the Earth and Water be not so conspicuously Operative (after separation) as the other three more active Principles, yet in this case it will not be amiss to remember the lucky Fable of *Menenius Agrippa*, of the dangerous Sedition of the Hands and Legs, and other more busie parts of the Body, against the seemingly unactive Stomack. And to this case also we may not unfitly apply that Reasoning of an Apostle, to another purpose; *If the Ear shall say, because I am not the Eye, I am not of the Body; Is it therefore not of the Body? If the whole*
Body

Body were Eye, where were the Hearing? If the whole were for hearing, where the smelling? In a word, since Earth and water appear, as clearly and as generally as the other Principles upon the resolution of Bodies, to be the Ingredients whereof they are made up; and since they are useful (if not immediately to us, or rather to Physicians) to the Bodies they constitute, and so though in somewhat a remoter way, are serviceable to us; to exclude them out of the number of Elements, is not to imitate Nature.

And on this occasion I cannot but take notice, that whereas the great Argument which the Chymists are wont to employ to vilify Earth and Water, and make them be look'd upon as useless & unworthy to be reckon'd among the Principles of Mixt Bodies, is, that they are not endow'd with Specifick Properties, but only with Elementary qualities; of which they use to speak very slightly, as of qualities contemptible and unactive: I see no sufficient Reason for this Practice of the Chymists: For 'tis confess'd that Heat is an Elementary Quality, and yet that an almost innumerable company of considerable Things are

are perform'd by Heat, is manifest to them that duly consider the various *Phænomena* wherein it intervenes as a principall Actor; and none ought less to ignore or distrust this Truth than a Chymist. Since almost all the operations and Productions of his Art are performed chiefly by the means of Heat. And as for Cold it self, upon whose account they so despise the Earth and Water, if they please to read in the Voyages of our English and Dutch Navigators in *Nova Zembla* and other Northern Regions what stupendous Things may be effected by Cold, they would not perhaps think it so despicable. And not to repeat what I lately recited to You out of *Paracelsus* himself, who by the help of an intense Cold teaches to separate the Quintessence of Wine; I will only now observe to You, that the Conservation of the Texture of many Bodies both animate and inanimate, do's so much depend upon the convenient motion both of their own Fluid and Looser Parts, & of the ambient Bodies, whether Air, Water, &c. that not only in humane Bodies we see that the immoderate or unseasonable coldness of the Air (especially

cially when it finds such Bodies overheated) do's very frequently discompose the *Oeconomie* of them, and occasion variety of Diseases; but in the solid and durable Body of Iron it self, in which one would not expect that suddain Cold should produce any notable change, it may have so great an operation, that if you take a Wire, or other slender piece of steel, and having brought it in the fire to a white heat, You suffer it afterwards to cool leasurely in the Air, it will when it is cold be much of the same hardness it was of before. Whereas if as soon as You remove it from the fire, you plunge it into cold water, it will upon the suddain Refrigeration acquire a very much greater hardness than it had before; Nay, and will become manifestly brittle. And that you may not impute this to any peculiar Quality in the Water, or other Liquor, or Unctuous matter, wherein such heated steel is wont to be quenched that it may be temper'd; I know a very skilful Tradesman, that divers times hardens steel by suddenly cooling it in a Body that is neither a liquor, nor so much as moist. A tryal of that Nature I remem-

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ber

ber I have seen made. And however by the operation that Water has upon steel quenched in it, whether upon the Account of its coldness and moisture, or upon that of any other of its qualities, it appears, that water is not alwaies so inefficacious and contemptible a Body, as our Chymists would have it pass for. And what I have said of the Efficacy of Cold and Heat, might perhaps be easily enough carried further by other considerations and experiments; were it not that having been mention'd only upon the By, I must not insist on it, but proceed to another Subject.

But, (pursues *Carneades*) though I think it Evident, that Earth and Phlegme are to be reckon'd among the Elements of most Animal and Vegetable Bodies, yet 'tis not upon that Account alone, that I think divers Bodies resolvable into more Substances than three. For there are two Experiments, that I have sometimes made to shew; that at least some Mixts are divisible into more Distinct Substances than five. The one of these Experiments, though 'twill be more seasonable for me to mention it fully anon, yet in the mean time, I shall
tell

tell you thus much of it, That out of two Distill'd Liquors which pass for Elements of the Bodies whence they are drawn, I can without Addition make a true Yellow and Inflammable Sulphur, notwithstanding that the two Liquors remain afterwards Distinct. Of the other Experiment, which perhaps will not be altogether unworthy your Notice, I must now give you this particular Account. I had long observ'd, that by the Destillation of divers Woods, both in Ordinary, and some unusuall sorts of Vessels, the Copious Spirit that came over, had besides a strong tast, to be met with in the Emphyreumatical Spirits of many other Bodies, an Acidity almost like that of Vinegar: Wherefore I suspected, that though the sowerish Liquor Distill'd, for Instance, from Box-Wood, be lookt upon by Chymists as barely the Spirit of it, and therefore as one single Element or Principle; yet it does really consist of two Differing Substances, and may be divisible into them; and consequently, that such Woods and other Mixts as abound with such a Vinegar, may be said to consist of one Element or Principle, more than the Chymists as yet are

○ 2

are Aware of, Wherefore bethinking my self, how the separation of these two Spirits might be made, I Quickly found, that there were several waies of Compassing it. But that of them which I shall at present mention was this, Having Destill'd a Quantity of Box-Wood *per se*, and slowly rectify'd the sowerish Spirit, the better to free it both from Oyle and Phlegme, I cast into this Rectify'd Liquor a convenient Quantity of Powder'd Coral, expecting that the Acid part of the Liquor, would Corrode the Coral, and being associated with it would be so retain'd by it, that the other part of the Liquor, which was not of an acid Nature, nor fit to fasten upon the Corals, would be permitted to ascend alone. Nor was I deceiv'd in my Expectation; For having gently abstracted the Liquor from the Corals, there came over a Spirit of a Strong smell, and of a tast very piercing but without any sourness; and which was in diverse qualities manifestly different, not only from a Spirit of Vinegar, but from some Spirit of the same Wood, that I purposely kept by me without depriving it of its acid Ingredient. And to satisfy you,

you, that these two Substances were of a very differing Nature, I might informe you of several Tryals that I made, but must not name some of them, because I cannot do so without making some unreasonable discoveries. Yet this I shall tell you at present that the sowre Spirit of *Box*, not only would, as I just now related, dissolve Corals, which the other would not fasten on, but being pour'd upon Salt of Tartar would immediately boyle and hiss, whereas the other would lye quietly upon it. The acid Spirit pour'd upon *Minium* made a Sugar of Lead, which I did not find the other to do; some drops of this penetrant spirit being mingl'd with some drops of the blew Syrup of Violets seem'd rather to dilute than otherwise alter the colour; whereas the Acid Spirit turn'd the Syrup of a reddish colour, and would probably have made it of as pure a red, as Acid Salts are wont to do, had not its operation been hindered by the mixture of the other Spirit. A few drops of the compound Spirit being shaken into a pretty quantity of the infusion of *Lignum Nephriticum*; presently destroyed all the blewish colour, whereas the other Spirit

would not take it away. To all which it might be added, that having for tryals sake pour'd fair water upon the Corals that remained in the bottom of the glass wherein I had rectified the double spirit (if I may so call it) that was first drawn from the Box, I found according to my expectation that the Acid Spirit had really dissolved the Corals and had coagulated with them. For by the affusion of fair Water, I Obtain'd a Solution, which (to note that singularity upon the by) was red, whence the Water being evaporated, there remained a soluble Substance much like the Ordinary Salt of Coral, as Chymists are pleas'd to call that Magistery of Corals, which they make by dissolving them in common spirit of Vinegar, and abstracting the *Menstruum ad Siccitatem*. I know not whether I should subjoyne on this occasion, that the simple spirit of Box, if Chymists will have it therefore Saline because it has a strong tast, will furnish us with a new kind of Saline Bodies, differing from those hitherto taken notice of. For whereas of the three chief sorts of Salts, the Acid, the Alcalizate, and the Sulphureous, there is none that

seems

seems to be friends with both the other two, as I may, e're it be long, have occasion to shew; I did not find but that the simple spirit of Box did agree very well (at least as farr as I had occasion to try it) both with the Acid and the other Salts. For though it would lye very quiet with salt of Tartar, Spirit of Urine, or other Bodies, whose Salts were either of an Alcalizate or fugitive Nature; yet did not the mingling of Oyle of Vitriol it self produce any hissing or Effervescence, which you know is wont to ensue upon the Affusion of that highly Acid Liquor upon either of the Bodies newly mentioned.

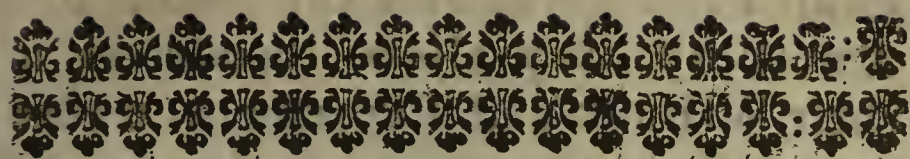
I think my self, (saies *Eleutherius*) beholden to you, for this Experiment; not only because I foresee you will make it helpful to you in the Enquiry you are now upon, but because it teaches us a Method, whereby we may prepare a numerous sort of new spirits, which though more simple than any that are thought Elementary, are manifestly endow'd with peculiar and powerful qualities, some of which may probably be of considerable use in Physick, as well alone as associated with other things; as

one may hopefully guess by the redness of that Solution your sowre Spirit made of Corals, and by some other circumstances of your Narrative. And suppose (pursues *Eleutherius*) that you are not so confin'd, for the separation of the Acid parts of these compound Spirits from the other, to employ Corals; but that you may as well make use of any Alcalizate Salt, or of Pearls, or Crabs eyes, or any other Body, upon which common Spirit of Vinegar will easily work, and, to speak in an *Helmontian* Phrase, Exantlate it self.

I have not yet tryed, (saies *Carneades*) of what use the mention'd liquors may be in Physick, either as Medicines or as *Menstruums*: But I could mention now (and may another time) divers of the tryals that I made to satisfy my self of the difference of these two Liquors. But that, as I allow your thinking what you newly told me about Corals, I presume you will allow me, from what I have said already, to deduce this Corollary; That there are divers compound bodies, which may be resolv'd into four such differing Substances, as may as well merit the name of Principles, as those to which the Chymists

mists freely give it. For since they scruple not to reckon that which I call the compound Spirit of Box, for the spirit, or as others would have it, the Mercury of that Wood, I see not, why the Acid liquor, and the other, should not each of them, especially that last named, be lookt upon as more worthy to be called an Elementary Principle; since it must needs be of a more simple nature than the Liquor, which was found to be divisible into that, and the Acid Spirit. And this further use (continues *Carneades*) may be made of our experiment to my present purpose, that it may give us a rise to suspect, that since a Liquor reputed by the Chymists to be, without dispute, Homogeneous, is by so slight a way divisible into two distinct and more simple Ingredients, some more skillful or happier Experimenter than I may find a way either further to divide one of these Spirits, or to resolve some or other, if not all, of those other Ingredients of mixt Bodies, that have hitherto pass'd among Chymists for their Elements or Principles,

THE



T H E
SCEPTICAL CHYMIST

The Fourth Part.

AND thus much (saies *Carneades*) may suffice to be said of the *Number* of the Distinct Substances separable from mixt Bodies by the Fire: Wherefore I now proceed to consider the *nature* of them, and shew you, That though they seem *Homogeneous* Bodies, yet have they not the purity and simplicity that is requisite to Elements. And I should immediately proceed to the proof of my Assertion, but that the Confidence wherewith Chymists are wont to call each of the Substances we speak of by the name of Sulphur or Mercury, or the other of the Hypostatical

ticall Principles, and the intolerable Ambiguity they allow themselves in their Writings and Expressions, makes it necessary for me in Order to the Keeping you either from mistaking me, or thinking I mistake the Controversie, to take Notice to you and complain of the unreasonable Liberty they give themselves of playing with Names at pleasure. And indeed if I were oblig'd in this Dispute, to have such regard to the Phraseology of each particular Chymist, as not to Write any thing which this or that Author may not pretend, nor to contradict this or that sence, which he may give us as Occasion serves to his Ambiguous Expressions, I should scarce know how to dispute, nor which way to turn my self. For I find that even Eminent Writers, (such as *Raymund Lully*, *Paracelsus* and others) do so abuse the termes they employ, that as they will now and then give divers things, one name; so they will oftentimes give one thing, many Names; and some of them (perhaps) such, as do much more properly signifie some Distinct Body of another kind; nay even in Technical Words or Termes of Art, they

they refrain not from this Confounding Liberty; but will, as I have Observ'd, call the same Substance, sometimes the Sulphur, and Sometimes the Mercury of a Body. And now I speak of Mercury, I cannot but take Notice, that the Descriptions they give us of that Principle or Ingredient of mixt Bodies, are so intricate, that even those that have Endeavour'd to Polish and Illustrate the Notions of the Chymists, are fain to confess that they know not what to make of it either by Ingenuous Acknowledgments, or Descriptions that are not intelligible.

I must confess (saies *Eleutherius*) I have, in the reading of *Paracelsus* and other Chymical Authors, been troubled to find, that such hard Words and Equivocal Expressions, as You justly complain of, do even when they treat of Principles, seem to be studiously affected by those Writers; whether to make themselves to be admir'd by their Readers, and their Art appear more Venerable and Mysterious, or, (as they would have us think) to conceal from them a Knowledge themselves judge inestimable

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But whatever (saies *Carneades*) these Men may promise themselves from a Canting way of delivering the Principles of Nature, they will find the Major part of Knowing Men so vain, as when they understand not what they read, to conclude, that it is rather the Writers fault than their own. And those that are so ambitious to be admir'd by the Vulgar, that rather than go without the Admiration of the Ignorant they will expose themselves to the contempt of the Learned, those shall, by my consent, freely enjoy their Option. As for the Mystical Writers scrupling to Communicate their Knowledge, they might less to their own Disparagement, and to the trouble of their Readers, have conceal'd it by writing no Books, than by Writing bad ones. If *Themistius* were here, he would not stick to say, that Chymists write thus darkly, not because they think their Notions too precious to be explain'd, but because they fear that if they were explain'd, men would discern, that they are farr from being precious. And indeed, I fear that the chief Reason why Chymists have written so
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obscurely of their three Principles, may be, That not having Clear and Distinct Notions of them themselves, they cannot write otherwise than Confusedly of what they but Confusedly Apprehend: not to say that divers of them, being Conscious to the Invalidity of their Doctrine, might well enough discern that they could scarce keep themselves from being confuted, but by keeping themselves from being clearly understood. But though much may be said to Excuse the Chymists when they write Darkly, and Ænigmatically, about the Preparation of their *Elixir*, and Some few other grand *Arcana*, the divulging of which they may upon Grounds Plausible enough esteem unfit; yet when they pretend to teach the General Principles of Natural Philosophers, this Equivocal Way of Writing is not to be endur'd. For in such Speculative Enquiries, where the naked Knowledge of the Truth is the thing Principally aim'd at, what does he teach me worth thanks that does not, if he can, make his Notion intelligible to me, but by Mystical Termes, and Ambiguous Phrases darkens what he should clear up; and makes
me

me add the Trouble of gueſſing at the ſence of what he Equivocally expreſſes, to that of examining the Truth of what he ſeems to deliver. And if the matter of the Philoſophers Stone, and the manner of preparing it, be ſuch Myſteries as they would have the World believe them, they may Write Intelligibly and Clearly of the Principles of mixt Bodies in General, without Diſcovering what they call the Great Work. But for my part (Continues *Carneades*) what my Indignation at this Un-philoſophical way of teaching Principles has now extorted from me, is meant chiefly to excuſe my ſelf, if I ſhall hereafter oppoſe any Particular Opinion or aſſertion, that ſome Follower of *Paracelſus* or any Eminent Artiſt may pretend not to be his Maſters. For, as I told you long ſince, I am not Oblig'd to examine private mens writings, (which were a Labour as endleſs as unprofitable) being only engag'd to examine thoſe Opinions about the *Tria Prima*, which I find thoſe Chymiſts I have met with to agree in moſt: And I Doubt not but my Arguments againſt their Doctrines will be in great part eaſily

fly enough applicable ev'n to those private Opinions, which they do not so directly and exprefly oppose. And indeed, that which I am now entering upon being the Consideration of the things themselves whereinto *Spagyrist*s resolve mixt Bodies by the Fire, if I can shew that these are not of an Elementary Nature, it will be no great matter what names these or those Chymists have been pleased to give them. And I question not that to a Wise man, and consequently to *Eleutherius*, it will be lesse considerable to know, what Men Have thought of Things, than what they Should have thought.

In the fourth and last place, then, I consider, that as generally as Chymists are wont to appeal to Experience, and as confidently as they use to instance the several Substances separated by the Fire from a Mixt Body, as a sufficient proof of their being its component Elements: Yet those differing Substances are many of them farr enough from Elementary simplicity, and may be yet look'd upon as mixt Bodies, most of them also retaining, somewhat at least, if not very much, of the Nature of those

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Concretes whence they were forc'd:
I am glad (saies *Eleutherius*) to see
the Vanity or Envy of the canting Chy-
mists thus discover'd and chastis'd; and I
could wish, that Learned Men would
conspire together to make these delu-
ding Writers sensible, that they must no
longer hope with Impunity to abuse the
World. For whilst such Men are quietly
permitted to publish Books with pro-
mising Titles, and therein to Assert what
they please, and contradict others, and
ev'n themselves as they please, with as
little danger of being confuted as of be-
ing understood, they are encourag'd to
get themselves a name, at the cost of the
Readers, by finding that intelligent Men
are wont for the reason newly menti-
on'd, to let their Books and Them a-
lone: And the ignorant and credulous
(of which the number is still much grea-
ter than that of the other) are forward
to admire most what they least under-
stand. But if Judicious men skill'd in
Chymical affaires shall once agree to
write clearly and plainly of them, and
thereby keep men from being stunn'd,
as it were, or impos'd upon by dark or
empty Words; 'tis to be hop'd that
these

But after all this is said (Continues *Eleutherius*) it may be represented in favour of the Chymists, that, in one regard the Liberty they take in using names, if it be excusable at any time, may be more so when they speak of the substances whereinto their *Analysis* resolves mixt Bodies: Since as Parents have the Right to name their own Children, it has ever been allow'd to the Authors of new Inventions, to Impose Names upon them. And therefore the subjects we speak of being so the Productions of the Chymists Art, as not to be otherwise, but by it, obtainable; it seems but equitable to give the Artists leave to name them as they please: considering also that none are so fit and likely to teach us what those Bo-

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dies are, as they to whom we ow'd them.

I told You already (saies *Carneades*) that there is great Difference betwixt the being able to make Experiments, and the being able to give a Philosophical Account of them. And I will not now add, that many a Mine-digger may meet, whilst he follows his work, with a Gemm or a Mineral which he knowes not what to make of, till he shewes it a Jeweller or a Mineralist to be inform'd what it is. But that which I would rather have here observ'd, is, That the Chymists I am now in debate with have given up the Liberty You challeng'd for them, of using Names at Pleasure, and confin'd themselves by their Descriptions, though but such as they are, of their Principles; so that although they might freely have call'd any thing their *Analysis* presents them with, either Sulphur, or Mercury, or Gas, or Blas, or what they pleas'd; yet when they have told me that Sulphur (for instance) is a Primogeneal and simple Body, Inflamable, Odorous, &c. they must give me leave to disbelieve them, if they tell me that a Body that is either compounded or uninflamable is such

such a Sulphur; and to think they play with words, when they teach that Gold and some other Minerals abound with an Incombustible Sulphur, which is as proper an Expression, as a Sun-shine Night, or Fluid Ice.

But before I descend to the Mention of Particulars belonging to my Fourth Consideration, I think it convenient to premise a few Generals; some of which I shall the less need to insist on at present, because I have Touched on them already.

And first I must invite you to take notice of a certain passage in *Helmont*; which though I have not Found much heeded by his Readers, He Himself mentions as a notable thing, and I take to be a very considerable one; for whereas the Distill'd oyle of oyle-olive, though drawn

Illud notabile, in vino esse Spiritum quendam mitiorem ulterioris & nobilioris qualitatis participem, quam qui immediate per distillationem elicitur, diciturque aqua vita dephlegmata, quod facilius in simplici Olivarum oleo ad oculum spectatur. Quippe distillatum oleum absque laterum aut tegularum additamento, quodque oleum Philosophorum dicitur, multum differt ab ejus oleitate, quæ elicitur prius reducto oleo simplici in partes dissimulares sola digestionem & Salis circulari Paracelsici appositione; siquidem sal circulatum idem in pondere & quantitatibus pristinis ab oleo segregatur

postquam oleum olivarum in sui heterogeneitates est dispositum. i. u. ce enim tunc Oleum Olivarum ex oleo, prout & suavisissimus vini spiritus à vino hoc pacto separantur longèq; ab aqua vita acrimonia distinctus, Helmont, Aura vitalis, pag. 725.

per se is (as I have try'd) of a very sharp and fretting Quality, and of an odious tast, He tells us that Simple oyle being only digested with *Paracelsus's sal circulatum*, is reduc'd into dissimilar parts, & yeelds a sweet Oyle, very differing from the oyle distill'd, from sallet oyle; as also that by the same way there may be separated from Wine a very sweet and gentle Spirit, partaking of a far other and nobler quality than that which is immediately drawn by distillation and call'd *Dephlegm'd Aqua vitæ*, from whose Acrimony this other spirit is exceedingly remote, although the *sal circulatum* that makes these *Anatomies* be separated from the Analyz'd Bodies, in the same weight and with the same qualities it had before; which Affirmation of *Helmont* if we admit to be true, we must acknowledge that there may be a very great disparity betwixt bodies of the same denomination (as several oyles, or several spirits) separable from compound Bodies: For, besides the differences I shall anon take notice of, betwixt those distill'd Oyles that are commonly known to Chymists, it appears by this, that by means of the *Sal Circulatum*, There may be

be quite another sort of Oyles obtain'd from the same Body; and who knowes but that there may be yet other Agents found in Nature, by whose help there may, whether by Transmutation or otherwise, be obtain'd from the Bodies Vulgarly call'd Mixt, Oyles or other substances, Differing from those of the same Denomination, known either to Vulgar Chymists, or even to *Helmont* Himself: but for fear You should tell me, that this is but a conjecture grounded upon another Man's Relation, whose Truth we have not the means to Experiment, I will not Insist upon it; but leaving You to Consider of it at leisure, I shall proceed to what is next.

Secondly, then, If that be True which was the Opinion of *Leucippus*, *Democritus*, and other prime *Anatomists* of old, and is in our dayes reviv'd by no mean Philosophers; namely, That our Culinary Fire, such as Chymists use, consists of swarmes of little Bodies swiftly moving, which by their smallness and motion are able to permeate the solidest and Compactest Bodies, and even Glass it Self; If this (I say) be True, since we see that In flints and other Concretes,

the Fiery part is Incorporated with the Groſſer, it will not be Irrational to conjecture; that multitudes of theſe Fiery Corpuscles, getting in at the Pores of the Glaſs, may aſſociate themſelves with the parts of the mixt Body whereon they work, and with them Conſtitute new Kinds of Compound Bodies, according as the Shape, Size, and other Affections of the Parts of the Diſſipated Body happen to diſpoſe them, in Reference to ſuch Combinations; of which alſo there may be the greater Number; if it be likewise granted that the Corpuscles of the Fire, though all exceeding minute, and very ſwiftly moved, are not all of the ſame bigneſs, nor Figure: And if I had not Weightier Conſiderations to Diſcourſe to you of, I could name to you, to Countenance what I have newly ſaid, ſome particular Experiments by which I have been Deduc'd to think, that the Particles of an open Fire working upon ſome Bodies may really Aſſociate themſelves therewith, and add to the Quantity. But becauſe I am not ſure, that when the Fire works upon Bodies included in Glaſſes, it does it by a reall Trajection.

jection of the Fiery Corpuscles themselves, through the Substance of the Glass, I will proceed to what is next to be mention'd.

I could (saies *Eleutherius*) help you to some Proofs, whereby I think it may be made very probable, that when the Fire acts immediately upon a Body, some of its Corpuscles may stick to those of the burnt Body, as they seem to do in Quicklime, but in greater numbers and more permanently. But for fear of retarding your Progress, I shall desire you to deferr this Enquiry till another time, and proceed as you intended.

You may then in the next place (saies *Carneades*) observe with me, that not only there are some Bodies, as Gold, and Silver, which do not by the usual Examens, made by Fire, Discover themselves to be mixt; but if (as You may Remember I formerly told You) it be a De-compound Body that is Dissipable into several Substances, by being expos'd to the Fire it may be resolv'd into such as are neither Elementary, nor such as it was upon its last mixture Compounded of; but into new
Kinds

Kinds of mixts. Of this I have already given You some Examples in Sope, Sugar of Lead, and Vitriol. Now if we shall Consider that there are some Bodies, as well Natural, (as that I last nam'd) as Factitious, manifestly Decomposed; That in the Bowells of the Earth Nature may, as we see she sometimes does, make strange Mixtures; That Animals are nourish'd with other Animals and Plants; And, that these themselves have almost all of them their Nutriment and Growth, either from a certain Nitrous Juice Harbour'd in the Pores of the Earth, or from the Excrements of Animals, or from the putrify'd Bodies, either of living Creatures or Vegetables, or from other Substances of a Compounded Nature; if, I say, we consider this, it may seem probable, that there may be among the Works of Nature (not to mention those of Art) a greater number of Decomposed Bodies, than men take Notice of; And indeed, as I have formerly also observ'd, it does not at all appear, that all Mixtures must be of Elementary Bodies; but it seems farr more probable, that there are divers sorts of
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compound Bodies., even in regard of all or some of their Ingredients, consider'd Antecedently to their Mixture. For though some seem to be made up by the immediate Coalitions of the Elements, or Principles themselves, and therefore may be call'd *Prima Miſta*, or *Miſta Primaria*; yet it seems that many other Bodies are mingl'd (if I may so speak) at the second hand, their immediate Ingredients being not Elementary, but these primary Mixt newly spoken of; And from divers of those Secondary sorts of Mixts may result, by a further Composition, a Third sort, and so onwards. Nor is it improbable, that some Bodies are made up of Mixt Bodies, not all of the same Order, but of several; as (for Instance) a Concrete may consist of Ingredients, whereof the one may have been a primary, the other a Secondary Mixt Body; (as I have in Native Cinnaber, by my way of Resolving it, found both that Courser part that seems more properly to be Oar, and a Combustible Sulphur, and a Running Mercury:) or perhaps without any Ingredient of this latter sort, it may be compos'd of Mixt Bodies, some of them

them of the first, and some of the third Kind; And this may perhaps be somewhat Illustrated by reflecting upon what happens in some Chymical Preparations of those Medicines which they call their *Bezoardicum's*. For first, they take Antimony and Iron, which may be look'd upon as *Prima Mist*a; of these they compound a Starry *Regulus*, and to this they add according to their Intention, either Gold, or Silver, which makes with it a new and further Composition. To this they add Sublimate, which is it self a De-compound body, (consisting of common Quicksilver, and divers Salts United by Sublimation into a Chrystalline Substance) and from this Sublimate, and the other Metal-line Mixtures, they draw a Liquor, which may be allow'd to be of a yet more Compounded Nature. If it be true, as Chymists affirm it, that by this Art some of the Gold or Silver mingl'd with the *Regulus* may be carry'd over the Helme with it by the Sublimate; as indeed a Skilfull and Candid person complain'd to me a while since, That an experienc'd Friend of His and mine, having by such a way brought over a
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great Deal of Gold, in hope to do something further with it, which might be gainful to him, has not only miss'd of his Aim, but is unable to recover his Volatiliz'd Gold out of the Antimonial butter, wherewith it is strictly united.

Now (Continues *Carneades*) if a Compound body consist of Ingredients that are not meerly Elementary; it is not hard to conceive, that the Substances into which the Fire Dissolves it, though seemingly Homogeneous enough, may be of a Compounded Nature, those parts of each body that are most of Kin associating themselves into a Compound of a new Kind. As when (for example sake) I have caus'd Vitriol and *Sal Armoniack*, and Salt Petre to be mingl'd and Distill'd together, the Liquor that came over manifested it self not to be either Spirit of Nitre, or of *Sal Armoniack*, or of Vitrioll. For none of these would dissolve crude gold, which yet my Liquor was able readily to do; and thereby manifested it self to be a new Compound, consisting at least of Spirit of Nitre, and *Sal Armoniack*, (for the latter dissolv'd in the former, will

will Work on Gold) which nevertheless are not by any known way separable, and consequently would not pass for a Mixt Body, if we our selves did not, to obtain it, put and Distill together divers Concretes, whose Distinct Operations were known before hand. And, to add on this Occasion the Experiment I lately promis'd You, because it is Applicable to our present purpose, I shall Acquaint You, that suspecting the Common Oyle of Vitrioll not to be altogether such a simple Liquor as Chymists presume it, I mingl'd it with an equal or a Double Quantity (for I try'd the Experiment more than once) of common Oyle of Turpentine, such as together with the other Liquor I bought at the Drugsters. And having carefully (for the Experiment is Nice, and somewhat dangerous) Distill'd the Mixture in a small Glass Retort, I obtain'd according to my Desire, (besides the two Liquors I had put in) a pretty Quantity of a certaine substance, which sticking all about the Neck of the Retort Discover'd it self to be Sulphur, not only by a very strong Sulphureous smell, and by the colour of
Brimstone;

Brimstone; but also by this, That being put upon a coal, it was immediately kindl'd, and burn'd like common Sulphur. And of this Substance I have yet by me some little Parcells, which You may command and examine when you please. So that from this Experiment I may deduce either one, or both of these Propositions, That a real Sulphur may be made by the Conjunction of two such Substances as Chymists take for Elementary, And which did not either of them apart appear to have any such body in it; or that Oyle of Vitrioll though a Distill'd Liquor, and taken for part of the Saline Principle of the Concrete that yeelds it, may yet be so Compounded a body as to contain, besides its Saline part, a Sulphur like common Brimstone, which would hardly be it self a simple or un-compounded body.

I might (pursues *Carneades*) remind You, that I formerly represented it, as possible, That as there may be more Elements than five, or six; so the Elements of one body may be Different from those of another; whence it would follow, that from the Resolution of Decom-
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compound Bodies, there may result Mixts. of an altogether new kind, by the Coalition of Elements that never perhaps conven'd before. I might, I say, mind You of this; and add divers things to this second Consideration; but for fear of wanting time I willingly pretermitt them to pass on to the third, which is this, That the Fire does not alwaies barely resolve or take asunder; but may also after a new manner mingle and compound together the parts (whether Elementary or not) of the Body Dissipated by it.

This is so evident, (saies *Carneades*) in some obvious Examples, that I cannot but wonder at their Supineness that have not taken notice of it. For when Wood being burnt in a Chimney is dissipated by the Fire into Smoake and Ashes, that smoake composes soot, which is so far from being any one of the principles of the Wood, that (as I noted above) you may by a further *Analysis* separate five or six distinct substances from it. And as for the remaining Ashes, the Chymists themselves teach us, that by a further degree of fire they may be indissolubly united into glass. 'Tis true; that the *A-*
analysis

Analysis which the Chymists principally build upon is made, not in the open air, but in close Vessels; but however, the Examples lately produc'd may invite you shrewdly to suspect, That heat may as well compound as dissipate the Parts of mixt Bodies: and not to tell you, that I have known a Vitrification made even in close vessels; I must remind you that the Flowers of Antimony, and those of Sulphur, are very mix'd Bodies, though they ascend in close vessels: And that 'twas in stop'd glasses that I brought up the whole Body of Camphire. And whereas it may be objected, that all these Examples are of Bodies forc'd up in a dry, not a Fluid forme, as are the Liquors wont to be obtain'd by distillation; I answer, That besides 'tis possible, that a Body may be chang'd from Consistent to Fluid, or from Fluid to Consistent, without being otherwise much altered, as may appear by the Easiness wherewith in Winter, without any Addition or Separation of Visible Ingredients, the same substance may be quickly harden'd into brittle Ice, and thaw'd again into Fluid Water; Besides this, I say it would be consider'd, that common

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Quick-silver it self, which the Eminentest Chymists confess to be a mixt Body, may be Driven over the Helme in its Pristine forme of Quicksilver, and consequently, in that of a Liquor. And certainly 'tis possible that very compounded Bodies may concurr to Constitute Liquors; Since, not to mention that I have found it possible, by the help of a certain *Menstruum*, to distill Gold it self through a Retort, even with a Moderate Fire: Let us but consider what happens in Butter of Antimony. For if that be carefully rectify'd, it may be reduc'd into a very clear Liquor; and yet if You cast a quantity of fair water upon it, there will quickly precipitate a Ponderous and Vomitive Calx, which made before a considerable part of the Liquor, and yet is indeed (though some eminent Chymists would have it Mercurial) an Antimonial Body carryed over and kept dissolv'd by the Salts of the Sublimate, and consequently a compounded one; as You may find, if You will have the Curiosity to Examine this White powder by a skilful Reduction. And that You may not think that Bodies as compounded, as flowers of Brimstone, cannot be brought

brought to Concurr to Constitute Distill'd Liquors; And also That You may not imagine with Divers Learned Men that pretend no small skill in Chymistry; that at least no mixt Body can be brought over the Helme, but by corrosive Salts, I am ready to shew You, when You please, among other waies of bringing over Flowers of Brimstone (perhaps I might add even Mineral Sulphurs) some, wherein I employ none but Oleaginous bodies to make Volatile Liquors, in which not only the colour, but (which is a much surer mark) the smell and some Operations manifest that there is brought over a Sulphur that makes part of the Liquor.

One thing more there is, *Eleutherius*, (saies *Carneades*) which is so pertinent to my present purpose, that though I have touch'd upon it before, I cannot but on this occasion take notice of it. And it is this, That the Qualities or Accidents, upon whose account Chymists are wont to call a portion of Matter by the name of Mercury or some other of their Principles, are not such but that 'tis possible as Great (and therefore why not the like) may be produc'd by such changes

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of Texture, and other Alterations, as the Fire may make in the small Parts of a Body. I have already prov'd, when I discours'd of the second General Consideration, by what happens to plants nourish'd only with fair water, and Eggs hatch'd into Chickens, that by changing the disposition of the component parts of a Body, Nature is able to effect as great Changes in a parcell of Matter reputed similar, as those requisite to Denominate one of the *Tria Prima*. And though *Helmont* do somewhere wittily call the Fire the Destructor and the Artificial Death of Things; And although another Eminent Chymist and Physitian be pleas'd to build upon this, That Fire can never generate any thing but Fire; Yet You will, I doubt not, be of another mind, If You consider how many new sorts of mixt Bodies Chymists themselves have produc'd by means of the Fire: and particularly, if You consider how that Noble and Permanent Body, Glass, is not only manifestly produc'd by the violent action of the Fire, but has never, for ought we know, been produc'd any other way. And indeed it seems but an inconsiderate Assertion of
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some *Helmontians*, that every sort of Body of a Peculiar Denomination must be produc'd by some Seminal power; as I think I could evince, if I thought it so necessary, as it is for me to hasten to what I have further to discourse. Nor need it much move us, that there are some who look upon whatsoever the Fire is employ'd to produce, not as upon Natural but Artificial Bodies. For there is not alwaies such a difference as many imagine betwixt the one and the other: Nor is it so easy as they think, clearly to assigne that which Properly, Constantly, and Sufficiently, Discriminates them. But not to engage my self in so nice a Disquisition, it may now suffice to observe, that a thing is commonly termed Artificial, when a parcel of matter is by the Artificers hand, or Tools, or both, brought to such a shape or Form, as he Design'd before-hand in his Mind: Whereas in many of the Chymical Productions the effect would be produc'd whether the Artificer intended it or no; and is oftentimes very much other than he Intended or Look't for; and the Instruments employ'd, are not Tools Artificially fashion'd and

shaped, like those of Tradesmen, for this or that particular Work; but, for the most part, Agents of Nature's own providing, and whose chief Powers of Operation they receive from their own Nature or Texture, not the Artificer. And indeed, the Fire is as well a Natural Agent as Seed: And the Chymist that imployes it, does but apply Natural Agents and Patients, who being thus brought together, and acting according to their respective Natures, performe the work themselves; as Apples, Plums, or other fruit, are natural Productions, though the Garden bring and fasten together the Sciens & the Stock, and both Water, and do perhaps divers other waies Contribute to its bearing fruit. But, to proceed to what I was going to say; You may observe with me, *Eleutherius*, that, as I told You once before, Qualities sleight enough may serve to Denominate a Chymical Principle. For, when they anatomize a compound Body by the Fire, if they get a Substance inflammable, and that will not mingle with Water, that they presently call Sulphur; what is sapid and Dissoluble in Water, that must passe for Salt; Whatsoever is
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fix'd and indissoluble in Water, that they name Earth. And I was going to add, that Whatsoever Volatile substance they know not what to make of, not to say, whatsoever they please, that they call Mercury. But that these Qualities may either be produc'd, otherwise than by such as they call Seminal Agents, or may belong to bodies of a compounded Nature, may be shewn, among other Instances, in Glass made of ashes, where the exceeding strong-tasted *Alcalizate* Salt joyning with the Earth becomes insipid, and with it constitutes a Body; which though also dry, fixt and indissoluble in Water, is yet manifestly a mixt Body; and made so by the Fire it self.

And I remember to our present purpose, that *Helmont*, amongst other Medicines that he commends, has a short process; wherein, though the Directions for Practice are but obscurely intimated; yet I have some reason not to Disbelieve the Process, without affirming or denying any thing about the vertues of the remedy to be made by it. *Quando* (saies he) *oleum cinnamomi &c. suo sali alcali miscetur absque omni aqua, trium mensium artificiosa occultaque circulatione,*

Helmont
pag. 412.

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totum in salem volatilem commutatum est, vere essentiam sui simplicis in nobis exprimit & usque in prima nostri constitutiva sese ingerit. A not unlike Process he delivers in another place; from whence, if we suppose him to say true, I may argue, that since by the Fire there may be produc'd a substance that is as well Saline & volatile as the Salt of Hartshorn, blood, &c. which pass for Elementary; and since that this Volatile Salt is really compounded of a Chymical Oyle and a fixt Salt, the one made Volatile by the other, and both associated by the fire, it may well be suspected that other Substances, emerging upon the Dissipation of Bodies by the Fire, may be new sorts of Mixts, and consist of Substances of differing natures; and particularly, I have sometimes suspected, that since the Volatile Salts of Blood, Harts-horn, &c. are fugitive and endow'd with an exceeding strong smell, either that Chymists do Erroneously ascribe all odours to sulphurs, or that such Salts consist of some oyle parts well incorporated with the Saline ones. And the like conjecture I have also made concerning Spirit of Vinegar, which, though the Chymists think
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one of the Principles of that Body, and though being an Acid Spirit it seems to be much less of kin than Volatile Salts to sulphurs; yet, not to mention its piercing smell; which I know not with what congruity the Chymist will deduce from Salt, I wonder they have not taken notice of what their own *Tyrocinium Chymicum* teach us concerning the Distillation of *Saccharum Saturni*; out of which *Beguinus* assures Us, that he distill'd, besides a very fine spirit, no less than two Oyles, the one blood-red and ponderous, but the other swimming upon the top of the Spirit, and of a yellow colour; of which he saies that he kept then some by him, to verify what he delivers. And though I remember not that I have had two distinct Oyles from Sugar of Lead, yet that it will though distill'd without addition yeeld some Oyle, disagrees not with my Experience. I know the Chymists will be apt to pretend, that these Oyles are but the volatiliz'd sulphur of lead; and will perhaps argue it from what *Beguinus* relates, that when the Distillation is ended, you'll find a *Caput Mortuum* extreemly black, and (as he speaks) *nullius momenti*, as if the Body, or

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at least the chief part of the Metal it self were by the distillation carried over the Helme. But since you know as well as I that *Saccharum Saturni* is a kind of Magistery, made only by calcining of Lead *per se*, dissolving it in distill'd Vinegar, and Chrystalyzing the solution; if I had leasure to tell You how Differing a thing I did upon examination find the *Caput Mortuum*; so slighted by *Beguinus*, to be from what he represents it, I beleieve you would think the conjecture propos'd less probable than one or other of these three; either that this Oyle did formerly concurr to constitute the Spirit of Vinegar, and so that what passes for a Chymical Principle may yet be further resolvable into distinct substances; or that some parts of the Spirit together with some parts of the Lead may constitute a Chymical Oyle, which therefore though it pass for Homogeneous, may be a very compounded Body: or at least that by the action of the Distill'd Vinegar and the Saturnine Calx one upon another, part of the Liquor may be so alter'd as to be transmuted from an Acid Spirit into an Oyle. And though the truth of either of the two former conjectures would

would make the example I have reflected on more pertinent to my present argument; yet you'll easily discern, the Third and last Conjecture cannot be unserviceable to confirm some other passages of my discourse.

To return then to what I was saying just before I mention'd *Helmont's* Experiment, I shall subjoyne, That Chymists must confess also that in the perfectly Dephlegm'd spirit of Wine, or other Fermented Liquors, that which they call the Sulphur of the Concrete loses, by the Fermentation, the Property of Oyle, (which the Chymists likewise take to be the true Sulphur of the Mixt) of being unminglable with the Water. And if You will credit *Helmont*, a pound of the purest Spirit of Wine may barely by the help of pure Salt of Tartar (which is but the fixed Salt of Wine) be resolv'd or Transmuted into scarce half an ounce of Salt, and as much Elementary Water as amounts to the remaining part of the mention'd weight. And it may (as I think I formerly also noted) be doubted, whether that Fixt & Alcalizate Salt, which is so unanimously agreed on to be the Saline Principle of incinerated Bodies,

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Ostendi a-
lias, quo-
modo lib.
una aqua
vita com-
bibita in
sale Tar-
tari sicca-
to, vix fiat
semuncia
salis, cate-
rum totum
corpus fiat
aqua Ele-
mentalis.
Helmont.
in Aura
vitali.

be not, as 'tis Alcalizate, a Production of the Fire? For though the tast of Tartar, for Example, seem to argue that it contains a Salt before it be burn'd, yet that Salt being very Acid is of a quite Differing Tast from the Lixivate Salt of Calcin'd Tartar. And though it be not truly Objected against the Chymists, that they obtain all Salts they make, by reducing the Body they work on into Ashes with Violent Fires, (since Hartshorn, Amber, Blood, and divers other Mixts yeeld a copious Salt before they be burn'd to Ashes) yet this Volatile Salt Differs much, as we shall see anon, from the Fixt Alcalizate Salt I speak of; which for ought I remember is not producible by any known Way, without Incineration. 'Tis not unknown to Chymists, that Quicksilver may be Precipitated, without Addition, into a dry Powder, that remains so in Water. And some eminent *Spagyrist*s, and even *Raimund Lully* himself, teach, that meerly by the Fire Quicksilver may in convenient Vessels be reduc'd (at least in great part) into a thin Liquor like Water, and minglable with it. So that by the bare Action
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of the Fire, 'tis possible, that 'the parts of a mixt Body should be so dispos'd after new and differing manners, that it may be sometimes of one consistence, sometimes of another; And may in one State be dispos'd to be mingl'd with Water, and in another not. I could also shew you, that Bodies from which apart Chymists cannot obtain any thing that is Combustible, may by being associated together, and by the help of the Fire, afford an inflammable Substance. And that on the other side, 'tis possible for a Body to be inflammable, from which it would very much puzzle any ordinary Chymist, and perhaps any other, to separate an inflammable Principle or Ingredient. Wherefore, since the Principles of Chymists may receive their Denominations from Qualities, which it often exceeds not the power of Art, nor alwaies that of the Fire to produce; And since such Qualities may be found in Bodies that differ so much in other Qualities from one another, that they need not be allow'd to agree in that pure and simple Nature, which Principles, to be so indeed, must have; it may justly

justly be suspected, that many Productions of the Fire that are shew'd us by Chymists, as the Principles of the Concrete that afforded them, may be but a new kind of Mixts. And to annex, on this Occasion, to these arguments taken from the Nature of the thing, one of those which *Logicians* call *ad Hominem*, I shall desire You to take Notice, that though *Paracelsus* Himself, and some that are so mistaken as to think he could not be so, have ventur'd to teach, that not only the bodies here below, but the Elements themselves, and all the other Parts of the Universe, are compos'd of Salt, Sulphur and Mercury; yet the learned *Sennertus*, and all the more wary Chymists, have rejected that conceit, and do many of them confess, that the *Tria Prima* are each of them made up of the four Elements; and others of them make Earth and Water concurr with Salt, Sulphur and Mercury, to the Constitution of Mixt bodies. So that one sort of these *Spagyrist*s, notwithstanding the specious Titles they give to the productions of the Fire, do in effect grant what I contend for. And, of the other

ther sort I may well demand, to what Kind of Bodies the Phlegm and dead Earth, to be met with in Chymical Resolutions, are to be referr'd? For either they must say, with *Paracelsus*, but against their own Concessions, as well as against Experience, that these are also compos'd of the *Tria Prima*, whereof they cannot separate any one from either of them; or else they must confess that two of the vastest Bodies here below, Earth, and Water, are neither of them compos'd of the *Tria Prima*; and that consequently those three are not the Universal, and Adequate Ingredients, neither of all Sublunary Bodies, nor even of all mixt Bodies.

I know that the chief of these Chymists represent, that though the Distinct Substances into which they divide mixt bodies by the Fire, are not pure and Homogeneous; yet since the four Elements into which the *Aristotelians* pretend to resolve the like bodies by the same Agent, are not simple neither, as themselves acknowledge, 'tis as allowable for the Chymists to call the one Principles, as for the Peripateticks to call the other Elements; since in both cases the

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Imposition of the name is groundèd only upon the Predominancy of that Element whose name is ascrib'd to it. Nor shall I deny, that this Argument of the Chymists is no ill one against the *Aristotelians*. But what Answer can it prove to me, who you know am disputing as well against the *Aristotelian* Elements, as the Chymical Principles; and must not look upon any body as a true Principle or Element, but as yet compounded, which is not perfectly Homogeneous, but is further Resoluble into any number of Distinct Substances how small soever. And as for the Chymists calling a body Salt, or Sulphur, or Mercury, upon pretence that the Principle of the same name is predominant in it; That it self is an Acknowledgment of what I contend for; namely that these productions of the Fire, are yet compounded bodies. And yet whilst this is granted, it is affirm'd, but not prov'd; that the reputed Salt, or Sulphur, or Mercury, consists mainly of one body that deserves the name of a principle of the same Denomination. For how do Chymists make it appear that there are any such primitive and simple bodies

dies in those we are speaking of ; since 'tis upon the matter confess'd by the answer lately made, that these are not such? And if they pretend by Reason to evince what they affirm , what becomes of their confident boasts, that the Chymist (whom they therefore, after *Beguinus*, call a *Philosophus* or *Opifex Sensatus*) can convince our Eyes , by manifestly shewing in any mixt body those simple substances he teaches them to be compos'd of? And indeed, for the Chymists to have recourse in this case to other proofs than Experiments, as it is to wave the grand Argument that has all this while been given out for a Demonstrative One; so it releases me from the obligation to prosecute a Dispute wherein I am not engag'd to Examine any but Experimental proofs. I know it may plausibly enough be Represented, in favour of the Chymists, that it being evident that much the greater part of any thing they call Salt, or Sulphur, or Mercury, is really such; it would be very rigid to deny those Substances the names ascribed them , only because of some slight mixture of another Body ; since not only the Peripateticks call particu-

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lar parcels of matter Elementary, though they acknowledge that Elements are not to be any where found pure, at least here below ; And since especially there is a manifest Analogie & Resemblance betwixt the bodies obtainable by Chymical Anatomies and the principles whose names are given them; I have, I say, consider'd that these things may be represented ; But as for what is drawn from the Custome of the Peripateticks, I have already told You , that though it may be employ'd against Them, Yet it is not available against me, who allow nothing to be an Element that is not perfectly Homogeneous. And whereas it is alledg'd, that the Predominant Principle ought to give a name to the substance wherein it abounds ; I answer, that that might much more reasonably be said, if either we or the Chymists had seen Nature take pure Salt, pure Sulphur, and pure Mercury , and compound of them every sort of Mixt Bodies. But, since 'tis to experience that they appeal, we must not take it for granted, that the Distill'd Oyle (for instance) of a plant is mainly compos'd of the pure principle call'd Sulphur , till they

they have given us an ocular proof, that there is in that sort of Plants such an Homogeneous Sulphur. For as for the specious argument, which is drawn from the Resemblance betwixt the Productions of the Fire, and the Respective, either *Aristotelian* Elements, or *Chymical* Principles, by whose names they are call'd; it will appear more plausible than cogent, if You will but recall to mind the state of the controversie; which is not, whether or no there be obtain'd from mixt Bodies certain substances that agree in outward appearance, or in some Qualities with Quicksilver or Brimstone, or some such obvious or copious Body; But whether or no all Bodies confess'd to be perfectly mixt were compos'd of, and are resolvable into a determinate number of primary unmixt Bodies. For, if you keep the state of the question in your Eye, you'll easily discern that there is much of what should be Demonstrated, left unprov'd by those Chymical Experiments we are Examining. But (not to repeat what I have already discover'd more at large) I shall now take notice, that it will not presently follow, that because a Production of the Fire has some

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affinity with some of the greater Masses of matter here below, that therefore they are both of the same Nature, and deserve the same Name; for the Chymists are not content, that flame should be look't upon as a parcel of the Element of Fire, though it be hot, dry, and active, because it wants some other Qualities belonging to the nature of Elementary fire. Nor will they let the Peripateticks call Ashes, or Quicklime, Earth, notwithstanding the many likenesses between them; because they are not tasteless, as Elementary Earth ought to be: But if you should ask me, what then it is, that all the Chymical Anatomies of Bodies do prove, if they prove not that they consist of the three Principles into which the fire resolves them? I answer that their Dissolutions may be granted to prove, that some mixt bodies (for in many it will not hold) are by the fire, when they are included in close Vessels, (for that Condition also is often requisite) dissoluble into several Substances differing in some Qualities, but principally in Consistence. So that out of most of them may be obtain'd a fixt Substance partly saline, and partly insipid, an
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unctuous Liquor, and another Liquor or more that without being unctuous have a manifest taste. Now if Chymists will agree to call the dry and sapid substance Salt, the Unctuous liquor Sulphur, and the other Mercury, I shall not much quarrel with them for so doing: But if they will tell me that Salt, Sulphur, and Mercury, are simple and primary bodies whereof each mixt body was actually compounded, and which was really in it antecedently to the operation of the fire, they must give me leave to doubt whether (whatever their other arguments may do) their Experiments prove all this. And if they will also tell me that the Substances their Anatomies are wont to afford them, are pure and similar, as Principles ought to be, they must give me leave to believe my own senses; and their own confessions, before their bare Assertions. And that you may not (*Eleutherius*) think I deal so rigidly with them, because I scruple to Take these Productions of the Fire for such as the Chymists would have them pass for, upon the account of their having some affinity with them; consider a little with me, that in regard an Element or Princi-

ple ought to be perfectly Similar and Homogeneous, there is no just cause why I should rather give the body propos'd the Name of this or that Element or Principle, because it has a resemblance to it in some obvious Quality, rather than deny it that name upon the account of divers other Qualities, wherein the propos'd Bodies are unlike; and if you do but consider what slight and easily producible qualities they are that suffice, as I have already more than once observ'd, to Denominate a Chymical Principle or an Element, you'll not, I hope, think my wariness to be destitute either of Example, or else of Reason. For we see that the Chymists will not allow the *Aristotelians* that the Salt in Ashes ought to be called Earth, though the Saline and Terrestrial part symbolize in weight, in dryness, in fixness and fusibility, only because the one is sapid and dissoluble in Water, and the other not: Besides, we see that sapidness and volatility are wont to denominate the Chymists Mercury or Spirit; and yet how many Bodies, think you, may agree in those Qualities which may yet be of very differing natures, and disagree in

quali-

qualities either more numerous, or more considerable, or both. For not only Spirit of Nitre, Aqua Fortis, Spirit of Salt, Spirit of Oyle of Vitriol, Spirit of Alum, Spirit of Vinegar, and all Saline Liquors Distill'd from Animal Bodies, but all the Acetous Spirits of Woods freed from their Vinegar; All these, I say, and many others must belong to the Chymists Mercury, though it appear not why some of them should more be comprehended under one denomination than the Chymists Sulphur, or Oyle should likewise be; for their Distill'd Oyles are also Fluid, Volatile, and Tastable, as well as their Mercury; Nor is it Necessary, that their Sulphur should be Unctuous or Dissoluble in Water, since they generally referr Spirit of Wine to Sulphurs, although that Spirit be not Unctuous, and will freely mingle with Water. So that bare Inflammability must constitute the Essence of the Chymists Sulphur; as uninflammableness joyned with any taste is enough to intitle a Distill'd Liquor to be their Mercury. Now since I can further observe to You, that Spirit of Nitre and Spirit of Hartshorne being pour'd together will boyle

and hisse and rosse up one another into the air, which the Chymists make signes of great Antipathy in the Natures of Bodies; (as indeed these Spirits differ much both in Taste, Smell, and Operations) Since I elsewhere tell you of my having made two sorts of Oyle out of the same mans blood, that would not mingle with one another; And since I might tell You Divers Examples I have met with, of the Contrariety of Bodies which according to the Chymists must be huddl'd up together under one Denomination; I leave you to Judge whether such a multitude of Substances as may agree in these slight Qualities, and yet Disagree in Others more Considerable, are more worthy to be call'd by the Name of a Principle (which ought to be pure and homogeneous) than to have appellations given them that may make them differ, in name too, from the bodies from which they so wildly differ in Nature. And hence also, by the by, you may perceive that 'tis not unreasonable to distrust the Chymists way of Argumentation, when being unable to shew us that such a Liquor is (for Example) purely

purely saline, they prove, that at least salt is much the predominant principle, because that the propos'd substance is strongly Tasted, and all Tast proceeds from salt; whereas those Spirits, such as spirit of Tartar, spirit of Harts-horn, and the like, which are reckoned to be the Mercuries of the Bodies that afford them, have manifestly a strong and piercing tast, and so has (according to what I formerly noted) the spirit of Box &c. even after the acid Liquor that concurr'd to compose it has been separated from it. And indeed, if sapidness belong not to the spirit or Mercurial Principle of Vegetables and Animals: I scarce know how it will be discriminated from their Phlegm, since by the absence of Inflamability it must be distinguish'd from their sulphur which affords me another Example, to prove how unacurate the Chymical Doctrine is in our present Case; since not only the spirits of Vegetables and Animals, but their Oyles are very strongly tasted, as he that shall but wet his tongue with Chymical Oyle of Cinnamon or of Cloves, or even of Turpentine, may quickly find, to his smart. And not only

I never try'd any Chymical Oyles whose tast was not very manifest and strong; but a skilful and inquisitive person who made it his business by elaborate operations to depurate Chymical Oyles, & reduce them to an Elementary simplicity, Informs us, that he never was able to make them at all Tasteless; whence I might inferr, that the proof Chymists confidently give us of a bodies being saline, is so far from demonstrating the Predominancy, that it does not clearly Evince so much as the presence of the saline Principle in it. But I will not (pursues *Carneades*) remind you, that the Volatile salt of Harts-horn, Amber, Blood &c. are exceeding strongly scented, notwithstanding that most Chymists deduce Odours from Sulphur, and from them argue the Predominancy of that Principle in the Odorous body, because I must not so much as add any new Examples of the incompetency of this sort of Chymical arguments; since having already detain'd You but too long in those generals that appertain to my fourth consideration 'tis time that I proceed to the particulars themselves, to which I thought fit they should be previous:

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These Generals (continues *Carneades*) being thus premis'd, we might the better survey the Unlikeness that an attentive and unprepossess'd observer may take notice of in each sort of Bodies which the Chymists are wont to call the salts or sulphurs or Mercuries of the Concretes that yeeld Them, as if they had all a simplicity, & Identity of Nature: whereas salts if they were all Elementary would as little differ as do the Drops of pure and simple Water. 'Tis known that both Chymists and Physicians ascribe to the fixt salts of calcin'd Bodies the vertues of their concretes; and consequently very differing Operations. So we find the *Alkali* of Wormwood much commended in distempers of the stomach; that of Eyebright for those that have a weak sight; and that of *Guajacum* (of which a great Quantity yeelds but a very little salt) is not only much commended in Venereal Diseases, but is beleev'd to have a peculiar purgative vertue, which yet I have not had occasion to try. And though, I confess, I have long thought, that these *Alcalizate* salts are, for the most part, very neer of kin, and retain very little of the properties of

of the Concretes whence they were separated; Yet being minded to Observe watchfully whether I could meet with any Exceptions to this General Observation, I observ'd at the Glass-house, that sometimes the Metal (as the Workmen call it) or Mass of colliquated Ingredients, w^{ch} by Blowing they fashion into Vessels of divers shapes, did sometimes prove of a very differing colour, and a somewhat differing Texture, from what was usual. And having enquired whether the cause of such Accidents might not be derived from the peculiar Nature of the fixt salt employ'd to bring the sand to fusion, I found that the knowingst Workmen imputed these Mis-adventures to the Ashes, of some certain kind of Wood, as having observ'd the ignobler kind of Glass I lately mention'd to be frequently produc'd, when they had employ'd such sorts of Ashes, which therefore they scruple to make use of, if they took notice of them beforehand. I remember also, that an Industrious Man of my acquaintance having bought a vast quantity of Tobacco stalks to make a fixt Salt with, I had the Curiosity to go see whether that Exotick
Plant,

Plant, w^{ch} so much abounds in volatile salt, would afford a peculiar kind of *Alcali*; and I was pleas'd to find that in the *Lixivium* of it, it was not necessary, as is usual, to evaporate all the Liquor, that there might be obtain'd a Saline Calx, consisting like lime quench'd in the Air of a heap of little Corpuscles of unregarded shapes: but the fixt salt shot into figur'd Chrystal, almost as Nitre or *Sal armoniack* and other uncalcin'd salts are wont to do; And I further remember that I have observ'd that in the fixt salt of Urine, brought by depuration to be ve-white, a tast not so unlike to that of common salt, and very differing from the wonted caustick Lixiviate tast of other salts made by Incineration. But because the Instances I have alledg'd of the Difference of *Alcalizate* salt are but few, and therefore I am still inclin'd to think, that most Chymists and many Physitians do, inconsiderately enough and without Warrant from Experience, ascribe the Vertues of the Concretes expos'd to Calcination, to the salts obtain'd by it; I shall rather to shew the Disparity of salts mention in the first Place the apparent Difference betwixt
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the Vegetable fixt salts and the Animal Volatile ones : As (for Example) betwixt salt of Tartar, and salt of Harts-horn; whereof the former is so fixt that 'twill indure the brunt of a violent Fire, and stand in fusion like a Metal; whereas the other (besides that it has a differing tast and a very differing smell) is so far from being fixt, that it will fly away in a gentle heat as easily as spirit of Wine it self. And to this I shall add, in the next place, That even among the Volatile salts themselves, there is a considerable Difference, as appears by the distinct Properties of (for Instance) salt of Amber, salt of Urine, salt of Mans Skull, (so much extoll'd against the falling Sicknes) and divers others which cannot escape an ordinary Observer. And this Diversity of Volatile salts I have observ'd to be sometimes Discernable even to the Eye, in their Figures. For the salt of Harts-horn I have observ'd to adhere to the Receiver in the forme almost of a *Parallelipipedon*; and of the Volatile salt of humane blood (long digested before distillation, with spirit of Wine) I can shew you store of grains of that Figure which *Geometrici-*
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ans call a *Rhombus*; though I dare not undertake that the Figures of these or other Saline Chrystals (if I may so call Them) will be alwaies the same, whatever degree of Fire have been employ'd to force them up, or how hastily soever they have been made to convene in the spirits or liquors, in the lower part of which I have usually observ'd them after a while to shoot. And although, as I lately told You, I seldom found any Difference, as to Medical Vertues, in the fixt Salts of Divers Vegetables; and accordingly I have suspected that most of these volatile Salts, having so great a Resemblance in smell, in tast, and fugitiveness, differ but little, if at all, in their Medicinal properties: As indeed I have found them generally to agree in

divers of them (as in their being somewhat Diaphoretick and very Deopilative) Yet I remember *Helmont* somewhere informs us, that there is this

Difference betwixt the saline spirit of Urine and that of Mans blood, that the former

Error vero per distillationem nobis monstrat etiam Spiritum salinum plane volatilem odore nequicquam ut nec gustu destinguibilem a Spiritu Urinae; In eo tamen essentialiter diversum, quod spiritus talis cruoris curat Epilepsiam, non autem spiritus salis lotii.

Helmont. Aura Vitalis.

former will not cure the Epilepsy, but the Latter will. Of the Efficacy also of the Salt of Common Amber against the same Disease in Children, (for in Grown Persons it is not a specifick) I may elsewhere have an Occasion to Entertain You. And when I consider that to the obtaining of these Volatile Salts (especially that of Urine) there is not requisite such a Destructive Violence of the Fire, as there is to get those Salts that must be made by Incineration, I am the more invited to conclude, that they may differ from one another and consequently recede from an Elementary Simplicity. And, if I could here shew You what Mr. Boyle has Observ'd, touching the Various Chymical Distinctions of Salts; You would quickly discern, not only that Chymists do give themselves a strange Liberty to call Concretes Salts, that are according to their own Rules to be look'd upon as very Compounded Bodies; but that among those very Salts that seem Elementary, because produc'd upon the Anatomy of the Bodies that yeeld them, there is not only a visible Disparity, but, to speak in the common Language,

guage, a manifest Antipathy or Contrariety: As is evident in the Ebullition and hissing that is wont to ensue, when the Acid Spirit of Vitriol, for Instance, is pour'd upon pot ashes, or Salt of Tartar. And I shall beg leave of this Gentleman, (saies *Carneades*) casting his Eyes on me, to let me observe to You out of some of his papers, particularly those wherein he treats of some Preparations of Urine, that not only one and the same body may have two Salts of a contrary Nature, as he exemplifies in the Spirit and *Alkali* of Nitre; but that from the same body there may without addition be obtain'd three differing and Visible Salts: For He Relates, that he observ'd in Urine, not only a Volatile and ChrySTALLINE Salt, and a fixt Salt, but likewise a kind of *Sal Armoniack*, or such a Salt as would sublime in the form of a salt, and therefore was not fixt, and yet was far from being so fugitive as the Volatile salt; from which it seem'd also otherwise to differ. I have indeed suspected that this may be a *Sal Armoniack* properly enough so call'd, as Compounded of the Volatile salt of Urine, and the

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fixt of the same Liquor, which, as I noted, is not unlike sea-salt; but that it self argues a manifest Difference betwixt the salts, since such a Volatile salt is not wont to Unite thus with an ordinary *Alcali*, but to fly away from it in the Heat. And on this occasion I remember, that to give some of my Friends an Ocular proof of the difference betwixt the fixt and Volatile salt of (the same Concrete) Wood, I devis'd the following Experiment. I took common Venetian sublimate, and dissolv'd as much of it as I well could in fair Water: then I took Wood Ashes, and pouring on them Warme Water, Dissolv'd their salt; and filtrating the Water, as soon as I found the *Lixivium* sufficiently sharp upon the tongue, I reserv'd it for use: Then one part of the former solution of sublimate dropping a little of this Dissolv'd Fixt salt of Wood, the Liquors presently turn'd of an Orange Colour; but upon the other part of the clear solution of sublimate putting some of the Volatile salt of Wood (which abounds in the spirit of foot) the Liquor immediately turn'd white, almost like Milke, and after

ter a while let fall a white sediment,
as the other Liquor did a Yellow one.

To all this that I
have said concern-
ing the Difference
of salts, I might add
what I formerly
told you, concern-

*Aliquando oleum Cinnamomi, &c.
suo sali Alkali miscetur absque om-
ni aqua, trium mensium Artificiosa
occultaque circulatione, totum in sa-
lem volatilem commutatum est.*

Helmont. Tria Prima Chymicorum,
&c. pag. 412.

ing the simple spirit of Box, and such
like Woods, which differ much from
the other salts hitherto mention'd, and
yet would belong to the saline Princi-
ple, if Chymists did truly teach that
all Tasts proceed from it. And I
might also annex, what I noted to you
out of *Helmont* concerning Bodies,
which, though they consist in great
part of Chymical Oyles, do yet ap-
pear but Volatile salts; But to insist on
these things, were to repeat; and there-
fore I shall proceed.

This Disparity is also highly eminent
in the separated sulphurs or Chymical
Oyles of things. For they contain so
much of the scent, and tast, and vertues,
of the Bodies whence they were drawn,
that they seem to be but the Material
Crafsis (if I may so speak) of their
Concretes. Thus the Oyles of Cinna-

mon, Cloves, Nutmegs and other spices, seem to be but the United Aromatick parts that did ennoble those Bodies. And 'tis a known thing, that Oyl of Cinnamon, and Oyle of Cloves, (which I have likewise observ'd in the Oyles of several Woods) will sink to the Bottom of Water: whereas those of Nutmegs and divers other Vegetables will swim upon it. The Oyle (abusively call'd spirit) of Roses swims at the Top of the Water in the forme of a white butter, which I remember not to have observ'd in any other Oyle drawn in any Limbeck; yet there is a way (not here to be declar'd) by which I have seen it come over in the forme of other Aromatick Oyles, to the Delight and Wonder of those that beheld it. In Oyle of Aniseeds, which I drew both with, and without Fermentation, I observ'd the whole Body of the Oyle in a cool place to thicken into the Consistence and Appearance of white Butter, which with the least heat resum'd its Former Liquidness. In the Oyle of Olive drawn over in a Retort, I have likewise more than once seen a spontaneous Coagulation in the Receiver:

Receiver: And I have of it by me thus Congeal'd; which is of such a strangely Penetrating scent, as if 'twould Perforate the Noses that approach it. The like pungent Odour I also observ'd in the Distill'd Liquor of common sope, which forc'd over from *Minium*, lately afforded an oyle of a most admirable Penetrancy; And he must be a great stranger, both to the Writings and preparations of Chymists, that sees not in the Oyles they distill from Vegetables and Animals, a considerable and obvious Difference. Nay I shall venture to add, *Eleutherius*, (what perhaps you will think of kin to a Paradox) that divers times out of the same Animal or Vegetable, there may be extracted Oyles of Natures obviously differing. To which purpose I shall not insist on the swimming and sinking Oyles, which I have sometimes observ'd to float on, and subside under the spirit of *Guajacum*, and that of divers other Vegetables Distill'd with a strong and lasting Fire; Nor shall I insist on the observation elsewhere mention'd, of the divers and unminglable oyles afforded us by Humane Blood long fermented and

Digested with spirit of Wine, because these kind of oyles may seem chiefly to differ in Consistence and Weight, being all of them high colour'd and adust. But the Experiment, which I devis'd to make out this Difference of the oyles of the same Vegetable, *ad Oculum*, (as they speak) was this that followes. I took a pound of Anise-seeds, and having grossly beaten them, caused them to be put into a very large glass Retort almost filled with fair Water; and placing this Retort in a sand Furnace, I caus'd a very Gentle heat to be administred during the first day, and a great part of the second, till the Water was for the most part drawn off, and had brought over with it at least most of the Volatile and Aromatick Oyle of the seeds. And then encreasing the Fire, and changing the Receiver, I obtain'd besides an Empyreumatical Spirit; a quantity of adust oyle; whereof a little floated upon the Spirit, and the rest was more heavy, and not easily separable from it. And whereas these oyles were very dark, and smell'd (as Chymists speak) so strongly of the Fire, that their Odour

did

did not betray from what Vegetables they had been forc'd; the other *Aromatick* Oyle was enrich'd with the genuine smell and tast of the Concrete; & spontaneously coagulating it self into white butter did manifest it self to be the true Oyle of Aniseeds; which Concrete I therefore chose to employ about this Experiment, that the Difference of these Oyles might be more conspicuous than it would have been, had I instead of it destill'd another Vegetable.

I had almost forgot to take notice, that there is another sort of Bodies, which though not obtain'd from Concretes by Distillation, many Chymists are wont to call their Sulphur; not only because such substances are, for the most part, high colour'd, (whence they are also, and that more properly, called Tinctures) as dissolv'd Sulphurs are wont to be; but especially because they are, for the most part, abstracted and separated from the rest of the Mass by Spirit of Wine: which Liquor those men supposing to be Sulphureous, they conclude, that what it works upon, and abstracts, must be a Sulphur also. And upon this account they presume, that they can sequester

the sulphur even of Minerals and Metals; from w^{ch} 'tis known that they cannot by fire alone separate it. To all This I shall answer; That if these sequestred substances were indeed the sulphurs of the Bodies whence they are drawn, there would as well be a great Disparity betwixt Chymical Sulphurs obtain'd by Spirit of Wine, as I have already shewn there is betwixt those obtain'd by Distillation in the forme of Oyles: which will be evident from hence, that not to urge that themselves ascribe distinct vertues to Mineral Tincture, extolling the Tincture of Gold against such and such Diseases; the Tincture of Antimony, or of its Glass, against others; and the Tincture of Emerald against others; 'tis plain, that in Tinctures drawn from Vegetables, if the superfluous spirit of Wine be distill'd off, it leaves at the bottom that thicker substance which Chymists use to call the Extract of the Vegetable. And that these Extracts are endow'd with very differing Qualities according to the Nature of the Particular Bodies that afforded them (though I fear seldom with so much of the specifick vertues as is wont to be imagin'd) is freely con-

confess'd both by Physicians and Chymists. But *Eleutherius* (saies *Carneades*) we may here take Notice that the Chymists do as well in this case, as in many others allow themselves a License to abuse Words: For not again to argue from the differing properties of Tinctures, that they are not exactly pure and Elementary Sulphurs; they would easily appear not to be so much as Sulphur's, although we should allow Chymical Oyles to deserve that Name. For however in some Mineral Tinctures the Natural fixtness of the extracted Body does not alwaies suffer it to be easily further resolvable into differing substances; Yet in very many extracts drawn from Vegetables, it may very easily be manifested that the spirit of Wine has not sequestred the sulphureous Ingredient from the saline and Mercurial ones; but has dissolv'd (for I take it to be a Solution) the finer Parts of the Concrete (without making any nice distinction of their being perfectly Sulphureous or not) and united it self with them into a kind of Magistery which consequently must contain Ingredients or Parts of several sorts. For we see that the
stones

stones that are rich in vitriol, being often drench'd with rain-Water, the Liquor will then extract a fine and transparent substance coagulable into Vitriol; and yet though this Vitriol be readily dissoluble in Water, it is not a true Elementary Salt, but, as You know, a body resolvable into very differing Parts, whereof one (as I shall have occasion to tell You anon) is yet of a Metalline, and consequently not of an Elementary Nature. You may consider also, that common Sulphur is readily dissoluble in Oyle of Turpentine, though notwithstanding its Name it abounds as well, if not as much, in Salt as in true Sulphur; witness the great quantity of saline Liquor it affords being set to flame away under a glass Bell. Nay I have, which perhaps You will think strange, with the same Oyle of Turpentine alone easily enough dissolv'd crude Antimony finely powder'd into a Blood-red Balsam, where-with perhaps considerable things may be perform'd in Surgery. And if it were now Requisite, I could tell You of some other Bodies, (such as Perhaps You would not suspect) that I have been able to work upon with certain Chymical Oyles.

But

But instead of digressing further I shall make this use of the Example I have nam'd. That 'tis not unlikely, but that Spirit of Wine which by its pungent tast, and by some other Qualities that argue it better, (especially its Reducibleness, according to *Helmont*, into *Alkali*, and Water,) seems to be as well of a Saline as of a Sulphureous Nature, may well be suppos'd Capable of Dissolving Substances, That are not meerly Elementary sulphurs, though perhaps they may abound with Parts that are of kin thereunto. For I find that Spirit of Wine will dissolve *Gumm Lacca*, *Benzoin*, and the *Resinous* Parts of *Jallap*, and even of *Guajacum*; whence we may well suspect that it may from Spices, Herbs, and other less compacted Vegetables, extract substances that are not perfect Sulphurs but mixt Bodies. And to put it past Dispute, there is many a Vulgar Extract drawn with Spirit of Wine, which committed to Distillation will afford such differing substances as will Loudly proclaim it to have been a very compounded Body. So that we may justly suspect, that even in Mineral Tinctures it will not alwaies follow, that because a red substance

stance is drawn from the Concrete by spirit of Wine, that Substance is its true and Elementary Sulphur. And though some of these Extracts may perhaps be inflammable; Yet, besides that others are not, and besides that their being reduc'd to such Minuteness of Parts may much facilitate their taking Fire; besides this, I say, We see that common Sulphur, common Oyle, Gumm Lac, and many Unctuous and Resinous Bodies, will flame well enough, though they be of very compounded Natures: Nay Travellers of Unsuspected Credit assure Us, as a known thing, that in some Northern Countries where Firr trees and Pines abound, the poorer sort of Inhabitants use Long splinters of those Resinous Woods to burn instead of Candles. And as for the redness wont to be met with in such solutions, I could easily shew, that 'tis not necessary it should proceed from the Sulphur of the Concrete, Dissolv'd by the Spirit of Wine; if I had leasure to manifest how much Chymists are wont to delude themselves and others, by the Ignorance of those other causes, upon whose account spirit of Wine and other *Menstruums* may acquire

a red or some other high colour. But to returne to our Chymical Oyles, supposing that they were exactly pure; Yet I hope they would be, as the best spirit of Wine is, but the more inflammable and deflagrable. And therefore since an Oyle can be by the Fire alone immediately turn'd into flame, which is something of a very differing Nature from it: I shall Demand how this Oyle can be a Primogeneal and Incorruptible Body, as most Chymists would have their Principles; Since it is further resolvable into flame, which whether or no it be a portion of the Element of Fire, as an *Aristotelian* would conclude, is certainly something of a very differing Nature from a Chymical Oyle, since it burnes, and shines, and mounts swiftly upwards; none of which a Chymical Oyle does, whilst it continues such. And if it should be Objected, that the Dissipated Parts of this flaming Oyle may be caught and collected again into Oyl or Sulphur; I shall demand, what Chymist appears to have ever done it; and without Examining whether it may not hence be as well said that sulphur is but compacted Fire, as that Fire is but diffus'd

diffus'd Sulphur, I shall leave you to consider whether it may not hence be argu'd, that neither Fire nor Sulphur are primitive and indestructible Bodies; and I shall further observe that at least it will hence appear, that a portion of matter may, without being Compounded with new Ingredients, by having the Texture and Motion of its small parts chang'd, be easily, by the means of the Fire, endow'd with new Qualities, more differing from them it had before, than are those which suffice to discriminate the Chymists Principles from one another.

We are next to Consider, whether in the Anatomy of mixt Bodies, that which Chymists call the Mercurial part of them be un-compounded, or no. But to tell You True, though Chymists do Unanimously affirm that their Resolutions discover a Principle, which they call Mercury, yet I find them to give of it Descriptions so Differing, and so Ænigmatical, that I, who am not ashamed to confess that I cannot understand what is not sense, must acknowledge to you that I know not what to make of them. *Paracelsus* himself, and there

therefore, as you will easily beleeeve, many of his Followers, does somewhere call that Mercury which ascends upon the burning of Wood, as the Peripateticks are wont to take the same smoake for Air; and so seems to define Mercury by Volatility, or (if I may coyne such a Word) Effumability. But since, in this Example, both Volatile Salt and Sulphur make part of the smoake, which does indeed consist also both of Phlegmatick and Terrene Corpuscles, this Notion is not to be admitted; And I find that the more sober Chymists themselves disavow it. Yet to shew you how little of clearness we are to expect in the accounts even of later *Spagyrist*s, be pleas'd to take notice, that *Beguinus*, even in his *Tyrocinium Chymicum*, written for the Instruction of Novices, when he comes to tell us what are meant by the *Tria Prima*, which for their being Principles ought to be defin'd the more accurately and plainly, gives us this Description of Mercury; *Mercurius* (saies he) *est liquor ille acidus, permeabilis, penetrabilis, æthereus, ac purissimus, à quo omnis Nutricatio, Sensus, Motus, Vires, Colores, Senectutisque Præproperæ retardatio,*

Chym. Ty-
rocin. lib.
1. Cap. 2.

datio. Which words are not so much a Definition of it, as an *Encomium*: and yet *Quercetanus* in his Description of the same Principle adds to these, divers other *Epithets*. But both of them, to skip very many other faults that may be found with their Metaphorical Descriptions, speak incongruously to the Chymists own Principles. For if Mercury be an Acid Liquor, either Hermetical Philosophy must err in ascribing all Tasts to Salt, or else Mercury must not be a Principle, but Compounded of a Saline Ingredient and somewhat else. *Libavius*, though he find great fault with the obscurity of what the Chymists write concerning their Mercurial Principle, does yet but give us such a Negative Description of it, as *Sennertus*, how favourable soever to the *Tria Prima*, is not satisfi'd with. And this *Sennertus* Himself, though the Learned st Champion for the Hypostatical Principles, does almost as frequently as justly complain of the unsatisfactoriness of what the Chymists teach concerning their Mercury; and yet he himself (but with his wonted modesty) Substitutes instead of the Description

of *Libavius*, another, which many Readers, especially if they be not Peripateticks, will not know what to make of. For scarce telling us any more, than that in all bodies that which is found besides Salt and Sulphur, and the Elements; or, as they call them, Phlegm and Dead Earth, is that Spirit which in *Aristotles* Language may be call'd *ἰσία ἀνάλογον τῷ ἄσπερον στοιχείῳ*. He saies that which I confess is not at all satisfactory to me; who do not love to seem to acquiesce in any mans Mystical Doctrines, that I may be thought to understand them.

If (saies *Eleutherius*) I durst presume that the same thing would be thought clear by me, and those that are fond of such cloudy Expressions as You justly Tax the Chymists for, I should venture to offer to Consideration, whether or no, since the Mercurial Principle that arises from Distillation is unanimously asserted to be distinct from the salt and Sulphur of the same Concrete, that may not be call'd the Mercury of a Body; which though it ascend in Distillation, as do the Phlegme and Sulphur, is neither insipid like the former, nor inflammable

mable like the latter. And therefore I would substitute to the too much abused Name of Mercury, the more clear and Familiar Appellation of Spirit, which is also now very much made use of even by the Chymists themselves of our times, though they have not given us so Distinct an Explication, as were fit, of what may be call'd the Spirit of a mixt Body.

I should not perhaps (saies *Carneades*) much quarrel with your Notion of Mercury. But as for the Chymists, what they can mean, with congruity to their own Principles; by the Mercury of Animals and Vegetables, 'twill not be so easie to find out; for they ascribe Tasts only to the Saline Principle, and consequently would be much put to it to shew what Liquor it is, in the Resolution of bodies, that not being insipid, for that they call Phlegme, neither is inflamable as Oyle or Sulphur, nor has any Tast; which according to them must proceed from a Mixture, at least, of Salt. And if we should take Spirit in the sence of the Word receiv'd among Modern Chymists and Physitians, for any Distill'd Liquor that
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is neither Phlegme nor oyle, the Appellation would yet appear Ambiguous enough. For plainly, that which first ascends in the Distillation of Wine and Fermented Liquors, is generally as well by Chymists as others reputed a Spirit. And yet pure Spirit of Wine being wholly inflamable ought according to them to be reckon'd to the Sulphureous, not the Mercurial Principle. And among the other Liquors that go under the name of Spirits, there are divers which seem to belong to the family of Salts, such as are the Spirits of Nitre, Vitriol, Sea-Salt and others, and even the Spirit of Harts-horn, being, as I have try'd, in great part, if not totally reducible into Salt and Phlegme, may be suspected to be but a Volatile Salt disguis'd by the Phlegme mingl'd with it into the forme of a Liquor. However if this be a Spirit, it manifestly differs very much from that of Vinegar, the Taste of the one being Acid, and the other Salt, and their Mixture in case they be very pure, sometimes occasioning an Effervescence like that of those Liquors the Chymists count most contrary to one another. And even among

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those Liquors that seem to have a better title, than those hitherto mention'd, to the name of Spirits, there appears a sensible Diversity; For spirit of Oak, for instance, differs from that of Tartar, and this from that of Box, or of *Guajacum*. And in short, even these spirits as well as other Distill'd Liquors manifest a great Disparity betwixt themselves, either in their Actions on our senses, or in their other operations.

And (continues *Carneades*) besides this Disparity that is to be met with among those Liquors that the Moderns call spirits, and take for similar bodies, what I have formerly told you concerning the Spirit of Box-wood may let you see that some of those Liquors not only have qualities very differing from others, but may be further resolved into substances differing from one another.

And since many moderne Chymists and other Naturalists are pleased to take the Mercurial spirit of Bodies for the same Principle, under differing names, I must invite you to observe, with me, the great difference that is conspicuous betwixt all the Vegetable and Animal spirits I have mention'd and
running

Mercury. I speak not of that which is commonly sold in shops that many of themselves will confesse to be a mixt Body ; but of that which is separated from Metals, which by some Chymists that seem more Philosophers than the rest, and especially by the above mentioned *Claveus*, is (for distinction sake) called *Mercurius Corporum*. Now this Metalline Liquor being one of those three Principles of which Mineral Bodies are by *Spagyrist*s affirmed to be compos'd and to be resolvable into them, the many notorious Differences betwixt them and the Mercuries, as They call Them, of Vegetables and Animals will allow me to inferr, either that Minerals and the other two sorts of Mixt Bodies consist not of the same Elements, or that those Principles whereinto Minerals are immediately resolved, which Chymists with great ostentation shew us as the true principles of them, are but Secondary Principles, or Mixts of a peculiar sort, which must be themselves reduc'd to a very differing forme, to be of the same kind with Vegetable and Animal Liquors.

But this is not all; for although I for-

merly told You how Little Credit there is to be given to the Chymical Processes commonly to be met with, of Extracting the Mercuries of Metals, Yet I will now add, that supposing that the more Judicious of Them do not untruly affirme that they have really drawn true and running Mercury from several Metals (which I wish they had clearly taught Us how to do also,) yet it may be still doubted whether such extracted Mercuries do not as well differ from common Quicksilver, and from one another, as from the Mercuries of Vegetables and Animals. *Claveus*, in his Apology,

Dixi autem de argento vivo à metallis prolicito, quod vulgare ob nimiam frigiditatem & humiditatem nimium concoctioni est contumax, nec ab auro solum alteratio coerceri potest. Gass. Clave. in Apol.

speaking of some experiments where- by Metalline Mercuries may be fixt into the nobler metals, adds, that he

spake of the Mercuries drawn from metals; because common Quicksilver by reason of its excessive coldness and moisture is unfit for that particular kind of operation; for which though a few lines before he prescribes in general the Mercuries of Metalline Bodies, yet he chiefly commends that drawn by art from silver.

And

And elsewhere, in the same Book, he tells us, that he himself tryed, that by bare coction the quicksilver of Tin or Pewter (*argentum vivum ex Stanno prolicuitum*) may by an efficient cause, (as he speaks) be turn'd into pure Gold. And the Experienc'd *Alexander van Suchten*, somewhere tells us, that by a way he intimates may be made a Mercury of Copper, not of the Silver colour of other Mercuries, but green; to which I shall add, that an eminent person, whose name his travells and learned writings have made famous, lately assur'd me that he had more than once seen the Mercury of Lead (which what ever Authors promise, you will find it very difficult to make, at least in any considerable quantity) fixt into perfect Gold. And being by me demanded whether or no any other Mercury would not as well have been changed by the same Operations, he assured me of the Negative.

And since I am fallen upon the mention of the Mercuries of metals, you will perhaps expect, (*Eleutherius*) that I should say something of their two other principles; but I must freely confess to you, that what Disparity there may be

between the salts and sulphurs of Metals or other Minerals, I am not myself experienced enough in the separations and examens of them, to venture to determine: (for as for the salts of Metals, I formerly represented it as a thing much to be question'd, whether they have any at all.) And for the processes of separation I find in Authors, if they were (what many of them are not) successfully practicable, as I noted above, yet they are to be performed by the assistance of other bodies, so hardly, if upon any termes at all, separable from them, that it is very difficult to give the separated principles all their due, and no more. But the Sulphur of Antimony which is vehemently vomitive, and the strongly scented Anodyne Sulphur of Vitriol inclines me to think that not only Mineral Sulphurs differ from Vegetable ones, but also from one another, retaining much of the nature of their Concretēs. The salts of metals, and of some sort of minerals, You will easily guesse (by the doubts I formerly express'd, whether metals have any salt at all) that I have not been so happy as yet too see, perhaps not for want of curiosity.

ty. But if *Paracelsus* did alwaies write so consentaneously to himself that his opinion were confidently to be collected from every place of his writings where he seems to expresse it, I might safely take upon me to tell you, that he both countenances in general what I have delivered in my Fourth main consideration, and in particular warrants me to suspect that there may be a difference in metalline and mineral Salts, as well as we find it in those of other bodies. For, *Sulphur*

(saies he) *aliud in auro, aliud in argento, aliud in ferro, aliud in plumbo, Stanno, &c. sic aliud in Saphyro, aliud in Smaragdo, aliud in rubino, chrysolitho, amethysto, magnete, &c. Item aliud in lapidibus, silice, salibus, fontibus, &c. nec vero tot sulphura tantum, sed & totidem salia; sal aliud in metallis, aliud in gemmis, aliud in lapidibus, aliud in salibus, aliud in vitriolo, aliud in alumine: similis etiam Mercurii est ratio. Alius in Metallis, alius in Gemmis, &c. Ita ut unicuique speciei suus peculiaris Mercurius sit. Et tamen res saltem tres sunt; una essentia est sulphur; una est sal; una est Mercurius. Adde quod & specialius adhuc singula dividantur; aurum enim non unum, sed multiplex, ut & non unum pyrum, pomum,*

*Paracel.
de Mine-
ral. Tract.
1. pag. 141.*

pomum, sed idem multiplex, totidem etiam sulphura auri, salia auri, mercurii auri; idem competit etiam metallis & gemmis; ut quot saphyri præstantiores, leviores, &c. tot etiam saphyrica sulphura, saphyrica salia, saphyrici Mercurii, &c. Idem verum etiam est de turconibus & gemmis aliis universis. From which passage (*Eleutherius*) I suppose you will think I might without rashness conclude, either that my opinion is favoured by that of *Paracelsus*, or that *Paracelsus* his opinion was not alwaies the same. But because in divers other places of his writings he seems to talk at a differing rate of the three Principles and the four Elements, I shall content my self to infer from the alledg'd passage, that if his doctrine be not consistent with that Part of mine which it is brought to countenance, it is very difficult to know what his opinion concerning Salt, Sulphur and Mercury, was; and that consequently we had reason about the beginning of our conferences, to decline taking upon us, either to examine or oppose it.

I know not whether I should on this occasion add, that those very bodies, the Chymists call Phlegme and Earth, do yet
recede

recede from an Elementary simplicity. That common Earth and Water frequently do so, notwithstanding the received contrary opinion, is not deny'd by the more wary of the moderne Peripateticks themselves: and certainly most Earths are much less simple bodies than is commonly imagined even by Chymists, who do not so considerately to prescribe and employ Earths Promiscuously in those distillations that require the mixture of some *caput mortuum*, to hinder the flowing together of the matter, & to retain its grosser parts. For I have found some Earths to yeeld by distillation a Liquor very far from being inodorous or insipid; and 'tis a known observation that most kinds of fat Earth kept cover'd from the rain, and hindred from spending themselves in the production of vegetables, will in time become impregnated with Salt Petre.

But I must remember that the Water and Earths I ought here to speak of, are such as are separated from mixt Bodies by the fire; and therefore to restrain my Discourse to such, I shall tell you, That we see the Phlegme of Vitriol (for instance) is a very effectual remedie
against

against burnes; and I know a very Famous and experienc'd *Physitian*, whose unsuspected secret (himself confess'd to me) it is, for the discussing of hard and Obstinate Tumours. The Phlegme of Vinegar, though drawn exceeding leasurely in a digesting Furnace, I have purposely made tryal of; and sometimes found it able to draw, though slowly, a saccharine sweetness out of Lead; and as I remember by long Digestion, I dissolv'd Corals in it. The Phlegme of the sugar of Saturne is said to have very peculiar properties. Divers Eminent Chymists teach, that it will dissolve Pearls, which being precipitated by the spirit of the same Concrete are thereby (as they say) rendred volatile; which has been confirmed to me, upon his own observation, by a person of great veracity. The Phlegme of Wine, and indeed divers other Liquors that are indiscriminately condemn'd to be cast away as phlegm, are endow'd with qualities that make them differ both from meer water, and from each other; and whereas the Chymists are pleas'd to call the *caput mortuum* of wt they have distill'd (after they have by affusion of water drawn away its salt)

salt) *terra damnata*, or Earth, it may be doubted whether or no those Earths are all of them perfectly alike: and it is scarce to be doubted, but that there are some of them which remain yet unreduc'd to an Elementary nature. The ashes of wood depriv'd of all the salt, and bone-Ashes, or calcin'd Hartshorn, which Refiners choose to make Tests of, as freest from Salt, seem unlike: and he that shall compare either of these insipid ashes to Lime, and much more to the *calx* of Talck, (though by the affusion of water they be exquisitely dulcify'd) will perhaps see cause to think them things of a somewhat differing nature. And it is evident in Colcothar that the exactest calcination, follow'd by an exquisite dulcification, does not alwaies reduce the remaining body into Elementary Earth; for after the salt or Vitriol (if the Calcination have been too faint) is drawn out of the Colcothar, the residue is not earth, but a mixt body, rich in Medical vertues (as experience has inform'd me) and which *Angelus Sala* affirms to be partly reducible into malleable Copper; which I judge very probable; for though when I was making

king Experiments upon Colcothar, I was destitute of a Furnace capable of giving a heat intense Enough to bring such a Calx to Fusion; yet having conjectur'd that if Colcothar abounded with that Metal, *Aqua Fortis* would find it out there, I put some dulcifi'd Colcothar into that *Menstruum*, and found the Liquor according to my Expectation presently Colour'd as Highly as if it had been an Ordinary Solution of Copper.

THE



T H E
SCEPTICAL CHYMIST

The Fifth Part.

HErē *Carneades* making a pause, I must not deny (saies his Friend to him) that I think You have sufficiently prov'd that these distinct Substances which Chymists are wont to obtain from Mixt Bodies, by their Vulgar Distillation, are not pure and simple enough to deserve, in Rigor of speaking, the Name of Elements, or Principles. But I suppose You have heard, that there are some Modern *Spagyrist*s, who give out that they can by further and more Skilfull Purifications, so reduce the separated Ingredients of Mixt Bodies to an Elementary simplicity, That
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the Oyles (for Instance) extracted from all Mixts shall as perfectly resemble one another, as the Drops of Water do.

If you remember (replies *Carneades*) that at the Beginning of our Conference with *Philoponus*, I declar'd to him before the rest of the Company, that I would not engage my self at present to do any more than examine the usual proofs alledg'd by Chymists, for the Vulgar doctrine of their three Hypostatical Principles; You will easily perceive that I am not oblig'd to make answer to what you newly propos'd; and that it rather grants, than disproves what I have been contending for: Since by pretending to make so great a change in the reputed Principles that Distillation affords the common *Spagyrist*s, 'tis plainly enough presuppos'd, that before such Artificial Depurations be made, the Substances to be made more simple were not yet simple enough to be look'd upon as Elementary; Wherefore in case the *Artists* you speak of could perform what they give out they can, yet I should not need to be asham'd of having question'd the Vulgar Opinion touching

touching the *Tria Prima*. And as to the thing it self, I shall freely acknowledge to you, that I love not to be forward in determining things to be impossible, till I know and have consider'd the means by which they are propos'd to be effected. And therefore I shall not peremptorily deny either the possibility of what these *Artists* promise, or my Assent to any just Inference; however destructive to my conjectures, that may be drawn from their performances. But give me leave to tell you withall, that because such promises are wont (as Experience has more than once inform'd me) to be much more easily made, than made good by Chymists, I must withhold my Beleef from their assertions, till their Experiments exact it; and must not be so easie as to expect before hand, an unlikely thing upon no stronger Inducements than are yet given me: Besides that I have not yet found by what I have heard of these *Artists*, that though they pretend to bring the several Substances into which the Fire has divided the Concrete, to an exquisite simplicity, They pretend also to be able by the Fire to divide all Concretes,

U Minerals;

Minerals; and others, into the same number of Distinct Substances. And in the mean time I must think it improbable, that they can either truly separate as many differing Bodies from Gold (for Instance) or *Ostiacolla*, as we can do from Wine, or Vitriol; or that the Mercury (for Example) of Gold or Saturn would be perfectly of the same Nature with that of Harts-horn; and that the sulphur of Antimony would be but Numerically different from the Distill'd butter or Oyle of Roses.

But suppose (saies *Eleutherius*) that you should meet with Chymists, who would allow you to take in Earth and Water into the number of the principles of Mixt Bodies; and being also content to change the Ambiguous Name of Mercury for that more intelligible one of spirit, should consequently make the principles of Compound Bodies to be Five; would you not think it something hard to reject so plausible an Opinion, only because the Five substances into which the Fire divides mixt Bodies are not exactly pure, and Homogeneous? For my part

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(Continues *Eleutherius*) I cannot but think it somewhat strange, in case this Opinion be not true, that it should fall out so luckily, that so great a Variety of Bodies should be Analyz'd by the Fire into just five Distinct substances; which so little differing from the Bodies that bear those names, may so Plausibly be call'd Oyle, Spirit, Salt, Water, and Earth.

The Opinion You now propose (answers *Carneades*) being another than that I was engag'd to examine, it is not requisite for me to Debate at this present; nor should I have leasure to do it thoroughly. Wherefore I shall only tell you in General, that though I think this Opinion in some respects more defensible than that of the Vulgar Chymists; yet you may easily enough learn from the past Discourse what may be thought of it: Since many of the Objections made against the Vulgar Doctrine of the Chymists seem, without much alteration, employable against this *Hypothesis* also. For, besides that this Doctrine does as well as the other take it for granted, (what is not easie to be prov'd) that the Fire is the true and Adequate Analyzer

lyzer of Bodies, and that all the Distinct substances obtainable from a mixt Body by the Fire, were so pre-existent in it, that they were but extricated from each other by the *Analysis*; Besides that this Opinion, too, ascribes to the Productions of the Fire an Elementary simplicity, which I have shewn not to belong to them; and besides that this Doctrine is lyable to some of the other Difficulties, wherewith That of the *Tria Prima* is incumber'd; Besides all this, I say, this quinary number of Elements, (if you pardon the Expression) ought at least to have been restrain'd to the Generality of Animal and Vegetable Bodies, since not only among these there are some Bodies, (as I formerly argu'd) which, for ought yet has been made to appear, do consist, either of fewer or more similar substances than precisely Five. But in the Mineral Kingdom, there is scarce one Concrete that has been evinc'd to be adequately divisible into such five Principles or Elements, and neither more nor lesse, as this Opinion would have every mixt Body to consist of.

And this very thing (continues *Carneades*)

neades) may serve to take away or lessen your Wonder, that just so many Bodies as five should be found upon the Resolution of Concretes. For since we find not that the fire can make any such *Analysis* (into five Elements) of Metals and other Mineral Bodies whose Texture is more strong and permanent, it remains that the Five Substances under consideration be Obtain'd from Vegetable and Animal Bodies, which (probably by reason of their looser Contexture) are capable of being Distill'd. And as to such Bodies, 'tis natural enough, that, whether we suppose that there are, or are not, precisely five Elements, there should ordinarily occur in the Dissipated parts a five Fold Diversity of Scheme: (if I may so speak) For if the Parts do not remain all fix'd, as in Gold, Calcin'd Talek, &c. nor all ascend, as in the Sublimation of Brimstone, Camphire, &c. but after their Dissipation do associate themselves into new Schemes of Matter; it is very likely, that they will by the Fire be divided into fix'd and Volatile (I mean, in Reference to that degree of heat by which they are destill'd) and those Volatile

parts will, for the most part, ascend either in a dry forme, which Chymists are pleas'd to call, if they be Tasteless, Flowers; if Sapid, Volatile Salt; or in a Liquid Forme. And this Liquor must be either inflamable, and so pass for oyl, or not inflamable, and yet subtile and pungent, which may be call'd Spirit; or else strengthless or insipid, which may be nam'd Phlegme, or Water. And as for the fixt part, or *Caput Mortuum*, it will most commonly consist of Corpuscles, partly Soluble in Water, or Sapid, (especially if the Saline parts were not so Volatile, as to fly away before) which make up its fixt salt; and partly insoluble and insipid, which therefore seems to challenge the name of Earth. But although upon this ground one might easily enough have foretold, that the differing substances obtain'd from a perfectly mixt Body by the Fire would for the most part be reducible to the five newly mention'd States of Matter; yet it will not presently follow, that these five Distinct substances were simple and primogeneal bodies, so pre-existent in the Concrete that the fire does but take them asunder. Besides that

that it does not appear, that all Mixt Bodies, (witness, Gold, Silver, Mercury, &c.) Nay nor perhaps all Vegetables, which may appear by what we said above of *Camphire*, *Benzoin*, &c. are resolvable by Fire into just such differing Schemes of Matter. Nor will the Experiments formerly alledg'd permit us to look upon these separated Substances as Elementary, or uncompounded. Neither will it be a sufficient Argument of their being Bodies that deserve the Names which Chymists are pleas'd to give them, that they have an Analogy in point of Consistence, or either Volatility or Fixtiness, or else some other obvious Quality, with the suppos'd Principles, whose names are ascrib'd to them. For, as I told you above, notwithstanding this Resemblance in some one Quality, there may be such a Disparity in others, as may be more fit to give them Differing Appellations, than the Resemblance is to give them one and the same. And indeed it seems but somewhat a gross Way of judging of the Nature of Bodies, to conclude without Scruple, that those must be of the same

Nature that agree in some such General Quality, as Fluidity, Dryness, Volatility, and the like : since each of those Qualities, or States of Matter, may Comprehend a great Variety of Bodies, otherwise of a very differing Nature ; as we may see in the Calxes of Gold, of Vitriol, and of Venetian Talck, compar'd with common Ashes, which yet are very dry, and fix'd by the vehemence of the Fire, as well as they. And as we may likewise gather from what I have formerly Observ'd, touching the Spirit of Box-Wood, which though a Volatile, Sapid, and not inflammable Liquor, as well as the Spirits of Harts-horn, of Blood and others, (and therefore has been hitherto call'd, the Spirit, and esteem'd for one of the Principles of the Wood that affords it) may yet, as I told You, be subdivided into two Liquors, differing from one another, and one of them at least, from the Generality of other Chymical Spirits.

But you may your self, if you please, (pursues *Carneades*) accomodate to the *Hypothesis* you propos'd what other particulars you shall think applicable to it,
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in the foregoing Discourse. For I think it unseasonable for me to medle now any further with a Controversie, which since it does not now belong to me, Leaves me at Liberty to Take my Own time to Declare my Self about it.

Eleutherius perceiving that *Carneades* was somewhat unwilling to spend any more time upon the debate of this Opinion, and having perhaps some thoughts of taking hence a Rise to make him Discourse it more fully another time, thought not fit as then to make any further mention to him of the propos'd opinion, but told him;

I presume I need not mind you, *Carneades*, That both the Patrons of the ternary number of Principles, and those that would have five Elements, endeavour to back their Experiments with a specious Reason or two; and especially some of those Embracers of the Opinion last nam'd (whom I have convers'd with, and found them Learned men) assigne this Reason of the necessity of five distinct Elements; that otherwise mixt Bodies could not be so compounded and temper'd as to obtain a due consistence

sistence and competent Duration. For Salt (say they) is the *Basis* of Solidity; and Permanency in Compound Bodies, without which the other four Elements might indeed be variously and loosely blended together, but would remain uncompacted; but that Salt might be dissolv'd into minute Parts, and convey'd to the other Substances to be compacted by it, and with it, there is a Necessity of Water. And that the mixture may not be too hard and brittle, a Sulphureous or Oily Principle must intervene to make the mass more tenacious; to this a Mercurial spirit must be superadded; which by its activity may for a while permeate, and as it were leaven the whole Mass, and thereby promote the more exquisite mixture and incorporation of the Ingredients. To all which (lastly) a portion of Earth must be added, which by its dryness and porosity may soak up part of that water wherein the Salt was dissolv'd, and eminently concur with the other ingredients to give the whole body the requisite consistence.

I perceive (saies *Carneades* smiling) that if it be true, as 'twas lately noted from the Proverb, *That good Wits have bad*

bad Memories, You have that Title, as well as a better, to a place among the good Wits. For you have already more than once forgot, that I declar'd to you that I would at this Conference Examine only the Experiments of my Adversaries, not their Speculative Reasons. Yet 'tis not (Subjoynes *Carneades*) for fear of meddling with the Argument you have propos'd, that I decline the examining it at present. For if when we are more at leasure, you shall have a mind that we may Solemnly consider of it together; I am confident we shall scarce finde it insoluble. And in the mean time we may observe, that such a way of Arguing may, it seems, be speciously accommodated to differing *Hypotheses*. For I find that *Beguinus*, and other Assertors of the *Tria Prima*, pretend to make out by such a way, the requisiteness of their Salt, Sulphur and Mercury, to constitute mixt Bodies, without taking notice of any necessity of an Addition of Water and Earth.

And indeed neither sort of Chymists seem to have duly consider'd how great Variety there is in the Textures and
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Consistences of Compound Bodies; and how little the consistence and Duration of many of them seem to accommodate and be explicable by the propos'd Notion. And not to mention those almost incorruptible Substances obtainable by the Fire, which I have prov'd to be somewhat compounded, and which the Chymists will readily grant not to be perfectly mixt Bodies: (Not to mention these, I say) If you will but recall to mind some of those Experiments, whereby I shew'd You that out of common Water only mixt Bodies (and even living ones) of very differing consistences, and resolvable by Fire into as many Principles as other bodies acknowledged to be perfectly mixt; may be produced if you do this, I say, you will not, I suppose, be averse from beleeving, y^e Nature by a convenient disposition of the minute parts of a portion of matter may contrive bodies durable enough, &c of this, or that, or the other Consistence, without being oblig'd to make use of all, much less of any Determinate quantity of each of the five Elements, or of the three Principles to compound such bodies of. And I have (pursues *Carneades*)

ades) something wonder'd, Chymists should not consider, that there is scarce any body in Nature so permanent and indissoluble as Glass; which yet themselves teach us may be made of bare Ashes, brought to fusion by the meer Violence of the Fire; so that, since Ashes are granted to consist but of pure Salt and simple Earth, sequestred from all the other Principles or Elements, they must acknowledge, That even Art it self can of two Elements only, or, if you please, one Principle and one Element, compound a Body more durable than almost any in the World. Which being undeniable, how will they prove that Nature cannot compound Mixt Bodies, and even durable Ones, under all the five Elements or Material Principles.

But to insist any longer on this Occasional Disquisition, Touching their Opinion that would Establish five Elements, were to remember as little as You did before, that the Debate of this matter is no part of my first undertaking; and consequently, that I have already spent time enough in what I look back upon but as a digression, or at best an Excursion.

And

And thus, *Eleutherius*, (saies *Carnedes*) having at length gone through the four Considerations I propos'd to Discourse unto you, I hold it not unfit, for fear my having insisted so long on each of them may have made you forget their Series, briefly to repeat them by telling you, that

Since, in the first place, it may justly be doubted whether or no the Fire be, as Chymists suppose it, the genuine and Universal Resolver of mixt Bodies;

Since we may doubt, in the next place, whether or no all the Distinct Substances that may be obtain'd from a mixt body by the Fire were pre-existent there in the formes in which they were separated from it;

Since also, though we should grant the Substances separable from mixt Bodies by the fire to have been their component Ingredients, yet the Number of such substances does not appear the same in all mixt Bodies; some of them being Resoluble into more differing substances than three, and Others not being Resoluble into so many as three;

And Since, Lastly, those very substances that are thus separated are not for the most

most part pure and Elementary bodies,
but new kinds of mixts ;

Since, I say, these things are so, I hope
you will allow me to infer, that the
Vulgar Experiments (I might perchance
have Added, the Arguments too) wont
to be Alledg'd by Chymists to prove,
that their three Hypostatical Principles
do adequately compose all mixt Bodies,
are not so demonstrative as to induce a
wary Person to acquiesce in their Do-
ctrine, which, till they Explain and prove
it better, will by its perplexing darknes
be more apt to puzzle than satisfy con-
sidering men, and will to them appear
incumbred with no small Difficulties.

And from what has been hitherto de-
duc'd (Continues *Carneades*) we may
Learn, what to Judge of the common
Practice of those Chymists, who because
they have found that diverse compound
Bodies (for it will not hold in All) can
be resolv'd into, or rather can be brought
to afford two or three differing Substan-
ces more than the Soot and Ashes,
whereinto the naked fire commonly di-
vides them in our Chymnies, cry up their
own Sect for the Invention of a New
Philosophy, some of them, as *Helmont &c.*
styling

styling themselves Philosophers by the Fire; and the most part not only ascribing, but as far as in them lies, engrossing to those of their Sect the Title of PHILOSOPHERS.

But alas, how narrow is this Philosophy, that reaches but to some of those compound Bodies, which we find but upon, or in the crust or outside of our terrestrial Globe, which is it self but a point in comparison of the vast extended Universe, of whose other and greater parts the Doctrine of the *Tria Prima* does not give us an Account! For what does it teach us, either of the Nature of the Sun, which Astronomers affirme to be eighty score & odd times bigger than the whole Earth? or of that of those numerous fixt Starrs, which, for ought we know, would very few, if any of them, appear inferior in bulke and brightness to the Sun, if they were as neer us as He? What does the knowing that Salt, Sulphur and Mercury, are the Principles of Mixt Bodies, informe us of the Nature of that vast, fluid, and Ætherial Substance, that seems to make up the interstellar, and consequently much the greatest part of the World? for as for the
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opinion commonly ascrib'd to *Paracelsus*, as if he would have not only the four Peripatetick Elements, but even the Celestial parts of the Universe to consist of his three Principles, since the modern Chymists themselves have not thought so groundless a conceit worth their owning, I shall not think it worth my confuting.

But I should perchance forgive the Hypothesis I have been all this while examining, if, though it reaches but to a very little part of the World, it did at least give us a satisfactory account of those things to which 'tis said to reach. But I find not, that it gives us any other than a very imperfect information even about mixt Bodies themselves: For how will the knowledge of the *Tria Prima* discover to us the Reason, why the Loadstone drawes a Needle, and disposes it to respect the Poles, and yet seldom precisely points at them? how will this Hypothesis reach Us how a Chick is formed in the Egge, or how the Seminal Principles of Mint, Pompions, and other Vegetables, that I mention'd to You above, can fashion Water into Various Plants, each of them endow'd with its peculiar

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and determinate shape, and with divers specifick and discriminating Qualities? How does this Hypothesis shew us, how much Salt, how much Sulphur, and how much Mercury must be taken to make a Chick or a Pompion? and if We know that: what Principle is it, that manages these Ingredients, and contrives (for instance) such Liquors as the White and Yolk of an Egge into such a variety of Textures as is requisite to fashion the Bones, Veines, Arteries, Nerves, Tendons, Feathers, Blood, and other parts of a Chick; and not only to fashion each Limbe, but to connect them altogether, after that manner that is most congruous to the perfection of the Animal which is to Consist of Them? For to say, that some more fine and subtile part of either or all the Hypostatical Principles is the Director in all this business, and the Architect of all this Elaborate structure, is to give one occasion to demand again, what proportion and way of mixture of the *Tria Prima* afforded this *Architectonick* Spirit, and what Agent made so skilful and happy a mixture? And the Answer to this Question, if the Chymists will keep themselves with

within their three Principles, will be ly-
able to the same Inconvenience, that the
Answer to the former was. And if it
were not to intrench upon the Theame
of a Friend of ours here present, I could
easily prosecute the Imperfections of
the Vulgar Chymists Philosophy, and
shew you, that by going about to expli-
cate by their three Principles, I say not,
all the abstruse Properties of mixt Bo-
dies, but even such Obvious and more
familiar *Phænomena* as *Fluidity & Firm-
ness*, The Colours and Figures of Stones,
Minerals, and other compound Bodies,
The Nutrition of either Plants or Ani-
mals, the Gravity of Gold or Quicksilver
compar'd with Wine or Spirit of Wine;
By attempting, I say, to render a reason
of these (to omit a thousand others as
difficult to account for) from any pro-
portion of the three simple Ingredients,
Chymists will be much more likely to
discredit themselves and their *Hypothe-
sis*, than satisfy an intelligent Inquirer
after Truth.

But (interposes *Eleutherius*) This Ob-
jection seems no more than may be made
against the four Peripatetick Elements.
And indeed almost against any other Hy-

Senn. de
Conf. &
Dissen. p.
165,

pothesis, that pretends by any Determinate Number of Material Ingredients to render a reason of the *Phænomena* of Nature. And as for the use of the Chymical Doctrine of the three Principles, I suppose you need not be told by me, that The great Champion of it, The Learned *Sennertus*, assigns this noble use of the *Tria Prima*, That from Them, as the neereft and most Proper Principles, may be Deduc'd and Demonstrated the Properties which are in Mixt Bodies, and which cannot be Proximately (as They speak) deduc'd from the Elements. And This, saies he, is chiefly Apparent, when we Inquire into the Properties and Faculties of Medicines. And I know (continues *Eleutherius*) That the Person You have assum'd, Of an Opponent of the *Hermetick Doctrine*, will not so far prevaile against your Native and wonted Equity, as To keep You from acknowledging that Philosophy is much beholden to the Notions and Discoveries of Chymists.

If the Chymists You speak of (Replies *Carneades*) had been so modest, or so Discreet, as to propose their Opinion

pinion of the *Tria Prima*, but as a Notion useful among Others, to increase Humane Knowledge, they had deserv'd more of our thanks, and less of our Opposition; but since the Thing, that they pretend, is not so much to contribute a Notion toward the Improvement of Philosophy, as to make this Notion (attended by a few less considerable ones) pass for a New Philosophy it self; Nay, since they boast so much of this phancie of theirs, that the famous *Quercetanus* scruples not to write, that if his most certain Doctrine of the three Principles were sufficiently Learned, Examined, and Cultivated, it would easily Dispel all the Darkness that benights our minds, and bring in a Clear Light, that would remove all Difficulties: This School affording Theorems and Axioms irrefragable, and to be admitted without Dispute by impartial Judges; and so useful withal, as to exempt us from the necessity of having recourse, for want of the knowledge of causes, to that Sanctuary of the ignorant, Occult Qualities; since I say, this Domestick Notion of the Chymists is so much overvalued by them, I cannot think it unfit, they should be

made sensible of their mistake ; and be admonish'd to take in more fruitful and comprehensive Principles, if they mean to give us an account of the *Phænomena* of Nature; and not confine themselves, and (as far as they can) others, to such narrow Principles, as I fear will scarce enable them to give an account (I mean an intelligible one) of the tenth part (I say not) of all the *Phænomena* of Nature; but even of all such as by the *Leucippian* or some of the other sorts of Principles may be plausibly enough explicated. And though I be not unwilling to grant, that the incompetency I impute to the *Chymical Hypothesis* is but the same which may be Objected against that of the four Elements, and divers other Doctrines that have been maintain'd by Learned men; yet since 'tis the *Chymical Hypothesis* only which I am now examining, I see not why, if what I impute to it be a real inconvenience, either it should cease to be so, or I should scruple to object it, because other Theories are lyable thereunto, as well as the *Hermetical*. For I know not why a Truth should be thought less a Truth for the being fit to overthrow variety of Errors,

I am oblig'd to You (continues *Carneades*, a little smiling) for the favourable Opinion You are pleas'd to express of my Equity, if there be no designe in it. But I need not be tempted by an Artifice, or invited by a Complement, to acknowledge the great service that the Labours of Chymists have done the Lovers of useful Learning; nor even on this occasion shall their Arrogance hinder my Gratitude. But since we are as well examining the truth of their Doctrine, as the merit of their industry, I must in order to the investigation of the first, continue a reply, to talk at the rate of the part I have assum'd; And tell you, that when I acknowledge the usefulness of the Labours of *Spagyrist*s to Natural Philosophy, I do it upon the score of their experiments, not upon that of Their Speculations; for it seems to me, that their Writings, as their Furnaces, afford as well smoak as light; and do little less obscure some subjects, than they illustrate others. And though I am unwilling to deny, that 'tis difficult for a man to be an Accomplisht Naturalist, that is a stranger to Chymistry; yet I look upon the common Operations and

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practices of Chymists, almost as I do on the Letters of the Alphabet, without whose knowledge 'tis very hard for a man to become a Philosopher; and yet that knowledge is very far from being sufficient to make him One,

But (saies *Carneades*, resuming a more serious Look) to consider a little more particularly what you alledg in favour of the Chymical Doctrine of the *Tria Prima*, though I shall readily acknowledge it not to be unuseful, and that the Divisers and Embracers of it have done the Common-Wealth of Learning some service, by helping to destroy that excessive esteem, or rather veneration, wherewith the Doctrine of the four Elements was almost as generally, as undeservedly entertain'd; yet what has been alledg'd concerning the usefulness of the *Tria Prima*, seems to me liable to no contemptible Difficulties.

And first, as for the very way of Probation, which the more Learned and more Sober Champions of the Chymical cause employ to evince the Chymical Principles in Mixt Bodies, it seems to me to be farr enough from being convincing. This grand and leading Argument,
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your Sennertus Himself, who layes Great weight upon it, and tells us, that the most Learned Philosophers employ this way of Reasoning to prove the most important things, proposes thus: *Ubique* (saies he) *pluribus eadem affectiones & qualitates insunt, per commune quoddam Principium insint necesse est, sicut omnia sunt Gravia propter terram, calida propter Ignem. At Colores, Odores, Sapores, esse φλογέν, & similia alia, mineralibus, Metallis, Gemmis, Lapidibus, Plantis, Animalibus insunt. Ergo per commune aliquod principium, & subiectum, insunt. At tale principium non sunt Elementa. Nullam enim habent ad tales qualitates producendas potentiam. Ergo alia principia, unde fluant, inquirenda sunt.*

In the Recital of this Argument, (saies Carneades) I therefore thought fit to retain the Language wherein the Author proposes it, that I might also retaine the propriety of some Latine Termes, to which I do not readily remember any that fully answer in English. But as for the Argumentation it self, 'tis built upon a precarious supposition, that seems to me neither Demonstrable nor true; for, how does it
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appear, that where the same Quality is to be met with in many Bodies, it must belong to them upon the Account of some one Body whereof they all partake? (For that the Major of our Authors Argument is to be Understood of the Material Ingredients of bodies, appears by the Instances of Earth and Fire he annexes to explain it.) For to begin with that very Example which he is pleas'd to alledge for himself; how can he prove, that the Gravity of all Bodies proceeds from what they participate of the Element of Earth? Since we see, that not only common Water, but the more pure Distill'd Rain Water is heavy; and Quicksilver is much heavier than Earth it self; though none of my Adversaries has yet prov'd, that it contains any of that Element. And I the Rather make use of this Example of Quicksilver, because I see not how the Assertors of the Elements will give any better Account of it than the Chymists. For if it be demanded how it comes to be Fluid, they will answer, that it participates much of the Nature of Water. And indeed, according to them, Water
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may be the Predominant Element in it, since we see, that severall Bodies, which by Distillation afford Liquors that weigh more than their *Caput Mortuum*, do not yet consist of Liquor enough to be Fluid. Yet if it be demanded how Quicksilver comes to be so heavy, then 'tis reply'd, that 'tis by reason of the Earth that abounds in it; but since, according to them, it must consist also of air, and partly of Fire, which they affirme to be light Elements, how comes it that it should be so much heavier than Earth of the same bulk, though to fill up the porosities and other Cavities it be made up into a mass or paste with Water, which it self they allow to be a heavy Element. But to returne to our *Spagyris*, we see that Chymical Oyles and fixt Salts, though never so exquisitely purify'd and freed from terrestrial parts, do yet remain ponderous enough. And Experience has inform'd me, that a pound, (for instance) of some of the heaviest Woods, as *Gucjacum*, that will sinke in Water, being burnt to Ashes will yeeld a much less weight of them (whereof I found but a small part to be Alcalizate) than much lighter

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er Vegetables: As also that the black Charcoal of it will not sink as did the wood, but swim; which argues that the Differing Gravity of Bodies proceeds chiefly from the particular Texture, as is manifest in Gold, the closest and Compactest of Bodies, which is many times heavier than we can possibly make any parcel of Earth of the same Bulk. I will not examine, what may be argu'd touching the Gravity or Quality Analogous thereunto, of even Celestial bodies, from the motion of the spots about the Sun, and from the appearing equality of the suppos'd Seas in the Moon; nor consider how little those *Phænomena* would agree with what *Senertus* presumes concerning Gravity. But further to invalidate his supposition, I shall demand, upon what Chymical Principle Fluidity depends? And yet Fluidity is, two or three perhaps excepted, the most diffused quality of the universe, and far more General than almost any other of those that are to be met with in any of the Chymical Principles, or *Aristotelian* Elements; since not only the Air, but that vast expansion we call Heaven, in comparison of which
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our Terrestrial Globe (supposing it were all Solid) is but a point ; and perhaps too the Sun and the fixt Stars are fluid bodies. I demand also, from which of the Chymical Principles Motion flowes ; which yet is an affection of matter much more General than any that can be deduc'd from any of the three Chymical Principles. I might ask the like Question concerning Light, which is not only to be found in the Kindl'd Sulphur of Mixt Bodies but (not to mention those sorts of rotten Woods, and rotten Fish that shine in the Dark) in the tails of living Glow-wormes, and in the Vast bodies of the Sun and Stars. I would gladly also know, in which of the three Principles the Quality, we call Sound, resides as in its proper Subject ; since either Oyl falling upon Oyle, or Spirit upon Spirit, or Salt upon Salt, in a great quantity, and from a considerable height, will make a noise, or if you please, create a sound, and (that the objection may reach the *Aristotelians*) so will also water upon water, and Earth upon Earth. And I could name other qualities to be met with in divers bodies, of which I
sup-

suppose my Adversaries will not in haste assign any Subject, upon whose Account it must needs be, that the quality belongs to all the other several bodies.

And, before I proceed any further, I must here invite you to compare the supposition we are examining, with some other of the Chymical Tenents. For, first they do in effect teach, that more than one quality may, belong to, and be deduc'd from, one Principle. For, they ascribe to Salt, Taste, and the power of Coagulation; to sulphur, as well Odours as inflamableness; And some of them ascribe to Mercury, Colours; as all of them do effumability, as they speak. And on the other side, it is evident that Volatility belongs in common to all the three Principles, and to Water too. For 'tis manifest that Chymical Oyles are Volatile; That also divers Salts, Emerging upon the Analysis of many Concretes, are very Volatile, is plain from the fugitiveness of Salt, of Harts-horne, flesh, &c. ascending in the Distillation of those bodies. How easily water may be made to ascend in Vapours, there is scarce any body that has not observ'd. And as
for

for what they call the Mercurial Principle of bodies, that is so apt to be rais'd in the form of Steam, that *Paracelsus* and others define it by that aptness to fly up; so that (to draw that inference by the way) it seems not that Chymists have been accurate in their Doctrine of qualities, and their respective Principles, since they both derive several qualities from the same Principle, and must ascribe the same quality to almost all their Principles and other bodies besides. And thus much for the first thing taken for granted, without sufficient proof, by your *Sennertus*: And to add that upon the By (continues *Carneades*) we may hence learn what to judge of the way of Argumentation, which that fierce Champion of the *Aristotelians* against the Chymists, *Anthionius* *Guntherus Billichius* employes, where he pretends to prove against *Beguinus*, that not only the four Elements do immediately concur to Constitute every mixt body, and are both present in it, and obtainable from it upon its Dissolution; but that in the *Tria Prima* themselves, whereinto Chymists are wont to resolve mixt Bodies, each of them clearly discovers

In Thessa-
lo redi-
vo. Cap.
10. pag. 73.
§ 74.

covers it self to consist of four Elements: The Ratiocination it self (pursues Carneades) being somewhat unusual, I did the other Day Transcribe it, and (saies He, pulling a Paper out of his Pocket) it is this. *Ordiamur, cum Beguino, à ligno viridi, quod si concremetur, videbīs in sudore Aquam, in fumo Aerem, in flamma & Prunis Ignem, Terram in cineribus: Quod si Beguino placuerit ex eo colligere humidum aquosum, cohibere humidum oleaginosum, extrahere ex cineribus salem; Ego ipsi in unoquoque horum seorsim quatuor Elementa ad oculum demonstrabo, eodem artificio quo in ligno viridi ea demonstravi. Humorem aquosum admovebo Igni. Ipse Aquam Ebullire videbit, in Vapore Aerem conspiciet, Ignem sentiet in aestu, plus minus Terræ in sedimento apparebit. Humor porro Oleaginosus aquam humiditate & fluiditate per se, accensus vero Ignem flamma prodit, fumo Aerem, fuligine, nidore & amurca terram. Salem denique ipse Beguinus siccum vocat & Terreſtrem, qui tamen nec fusus Aquam, nec caustica vi ignem celare potest; ignis vero violentia in halitus versus nec ab Aere se alienum esse demonstrat; Idem de Lacte, de Ovis, de semine Lini, de Garyophyllis, de Nitro, de*

de Sale Marino, denique de Antimonio, quod fuit de Ligno viridi Judicium; eadem de illorum partibus, quas Beguinus adducit, sententia, quæ de viridis ligni humore aquoso, quæ de liquore ejusdem oleoso, quæ de Sale fuit.

This bold Discourse (resumes *Carneades*, putting up again his Paper) I think it were not very difficult to confute, if his Arguments were as considerable, as our time will probably prove short for the remaining and more necessary Part of my Discourse; wherefore referring You for an Answer to what was said concerning the Dissipated Parts of a burnt piece of green Wood, to what I told *Themistius* on the like occasion, I might easily shew You, how slightly and superficially our *Guntherus* talks of the dividing the flame of Green Wood into his four Elements; when he makes that vapour to be Air, which being caught in Glasses and condens'd, presently discovers it self to have been but an Aggregate of innumerable very minute drops of Liquor; and when he would prove the Phlegmes being compos'd of Fire by that Heat which is adventitious to the Liquor, and ceases upon the absence of

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what produc'd it (whether that be an Agitation proceeding from the motion of the External Fire, or the presence of a Multitude of igneous Atomes pervading the pores of the Vessel, and nimbly permeating the whole Body of the Water) I might, I say, urge these and divers other Weaknesses of his Discourse. But I will rather take Notice of what is more pertinent to the Occasion of this Digression, namely, that Taking it for Granted, that Fluidity (with which he unwarily seems to confound Humidity) must proceed from the Element of Water, he makes a Chymical Oyle to Consist of that Elementary Liquor; and yet in the very next Words proves, that it consists also of Fire, by its Inflamability; not remembering that exquisitely pure Spirit of Wine is both more Fluid than Water it self; and yet will Flame all away without leaving the Least Aqueous Moisture behind it; and without such an *Amurca* and Soot as he would Deduce the presence of Earth from. So that the same Liquor may according to his Doctrine be concluded by its great Fluidity to be almost all Water; and by its burning all away to be all disguised
Fire

Fire. And by the like way of Probation our Author would shew that the fixt salt of Wood is compounded of the four Elements. For (saies he.) being turn'd by the violence of the Fire into steames, it shews it self to be of kin to Air; whereas I doubt whether he ever saw a true fixt Salt (which to become so, must have already endur'd the violence of an Incinerating Fire) brought by the Fire alone to ascend in the Forme of Exhalations; but I do not doubt that if he did, and had caught those Exhalations in convenient Vessels, he would have found them as well as the Steames of common Salt, &c. of a Saline, and not an Aëreal Nature. And whereas our Author takes it also for Granted, that the Fusibility of Salt must be Deduc'd from Water, it is indeed so much the Effect of heat variously agitating the Minute Parts of a Body, without regard to Water, that Gold (which by its being the heaviest and fixtest of Bodies, should be the most Earthy) will be brought to Fusion by a strong Fire; which sure is more likely to drive away, than increase its Aqueous Ingredient, if it have any; and on the other side, for want of a sufficient

Y 2 agitation

agitation of its minute parts, Ice is not Fluid, but Solid; though he presumes also that the Mordicant Quality of Bodies must proceed from a fiery ingredient; whereas, not to urge that the Light and inflammable parts, which are the most likely to belong to the Element of Fire, must probably be driven away by that time the violence of the Fire has reduc'd the Body to ashes; Not to urge this, I say, nor that Oyle of Vitriol which quenches Fire, burnes the Tongue and flesh of those that Unwarily tast or apply it, as a Caustick doth, it is precarious to prove the Presence of Fire in fixt salts from their Caustick power, unless it were first shewn, that all the Qualities ascribed to salts must be deduc'd from those of the Elements; which, had I Time, I could easily manifest to be no easy task. And not to mention that our Author makes a Body, as Homogeneous, as any he can produce for Elementary, belong both to Water and Fire, Though it be neither Fluid nor Insipid, like Water; nor light and Volatile, like Fire; he seems to omit in this Anatomy the Element of Earth, save that he intimates, That the salt may pass for
that:

that: But since a few lines before, he takes Ashes for Earth, I see not how he will avoid an Inconsistency either betwixt the Parts of his Discourse, or betwixt some of them and his Doctrine. For since there is a manifest Difference betwixt the Saline and the insipid Parts of Ashes, I see not how substances, That Disagree in such Notable Qualities, can be both said to be Portions of an Element, whose Nature requires that it be Homogeneous, especially in this case where an *Analysis* by the Fire is suppos'd to have separated it from the admixture of other Elements, which are confess'd by most *Aristotelians* to be Generally found in common Earth, and to render it impure. And sure if when we have consider'd for how little a Disparities sake the Peripateticks make these Symbolizing Bodies, Aire and Fire, to be two Distinct Elements, we shall also consider that the Saline part of Ashes is very strongly Tasted, and easily soluble in Water; whereas the other part of the same Ashes is insipid and indissoluble in the same Liquor: Not to add, that the one substance is Opacous, and the other some-

Y 3 what

what Diaphanous, nor that they differ in Divers other Particulars; If we consider those things, I say, we shall hardly think that both these Substances are Elementary Earth; And as to what is sometimes objected, that their Saline Tast is only an Effect of Incineration and Aduſtion, it has been elſewhere fully reply'd to, when propos'd by *Themistius*, and where it has been prov'd againſt him, that however inſipid Earth may perhaps by Additaments be turn'd into Salt, yet 'tis not like it ſhould be ſo by the Fire alone: For we ſee that when we refine Gold and Silver, the violentest Fires We can Employ on them give them not the leaſt Reliſh of Saltneſs. And I think *Philoponus* has rightly obſerv'd, that the Aſhes of ſome Concretes contain very little ſalt if any at all; For Refiners ſuppoſe that bone-aſhes are free from it, and therefore make uſe of them for Tests and Cuppels, which ought to be Deſtitute of Salt, leſt the Violence of the Fire ſhould bring them to Vittrification; And having purpoſely and heedfully taſted a Cuppel made of only bone-aſhes and fair Water, which I had caus'd to be expos'd

pos'd to a Very Violent Fire, acuated by the Blast of a large pair of Double Bellows, I could not perceive that the force of the Fire had imparted to it the least Saltness, or so much as made it less Insipid.

But (saies *Carneades*) since neither You nor I love Repetitions, I shall not now make any of what else was urg'd against *Themistius*, but rather invite You to take notice with me, that when our Authour, though a Learned Man, and one that pretends skill enough in Chymistry to reforme the whole Art, comes to make good his confident Undertaking, to give us an ocular Demonstration of the immediate Presence of the four Elements in the resolution of Green Wood, He is fain to say things that agree very little with one another. For about the beginning of that passage of His lately recited to you, he makes the sweat, as he calls it, of the green Wood to be Water, the smoak Aire, the shining Matter Fire, and the Ashes Earth; whereas a few lines after, he will in each of these, nay (as I just now noted) in one Distinct Part of the Ashes, shew the four Elements. So that either the former *Ana-*

lysis must be incompetent to prove that Number of Elements, since by it the burnt Concrete is not reduc'd into Elementary Bodies, but into such as are yet each of them compounded of the four Elements; or else these Qualities, from which he endeavours to deduce the presence of all the Elements in the fixt salt, and each of the other separated substances, will be but a precarious way of probation: especially if you consider, that the extracted *Alkali* of Wood, being, for ought appears, at least as similar a Body, as any that the Peripateticks can shew us, if its differing Qualities must argue the presence of Distinct Elements, it will scarce be possible for them by any way they know of employing the fire upon any Body, to shew that any Body is a Portion of a true Element: And this recalls to my mind, that I am now but in an occasional excursion, which aiming only to shew, that the Peripateticks as well as the Chymists take in our present Controversie something for granted, which they ought to prove, I shall returne to my exceptions, where I ended the first of them, and further tell you, that neither is that the only precarious thing,

thing that I take notice of in *Sennertus* his Argumentation; for when he inferrs, that because the Qualities he Mentions, as Colours, Smels, and the like, belong not to the Elements, they therefore must to the Chymical Principles; he takes that for granted; which will not in haste be prov'd; as I might here manifest, but that I may by and by have a fitter opportunity to take notice of it. And thus much at present may suffice to have Discours'd against the Supposition, that almost every Quality must have some *δεκτικὸν πρῶτον*, as they speak, some Native receptacle, wherein as in its proper Subject of inhesion it peculiarly resides; and on whose account that quality belongs to the other Bodies, Wherein it is to be met with. Now this Fundamental supposition being once Destroy'd, whatsoever is built upon it, must fall to ruine of it self.

But I consider further, that Chymists are (for ought I have found) far from being able to explicate by any of the *Tria Prima*, those qualities which they pretend to belong primarily unto it, and in mixt Bodies to Deduce from it. 'Tis true indeed, that such qualities
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are not explicable by the four Elements; but it will not therefore follow, that they are so by the three Hermetical Principles; and this is it that seems to have deceiv'd the Chymists, and is indeed a very common mistake amongst most Disputants, who argue as if there could be but two Opinions concerning the Difficulty about which they contend; and consequently they infer, that if their Adversaries Opinion be Erroneous, Their's must needs be the Truth; whereas many questions, and especially in matters Physiological, may admit of so many Differing *Hypotheses*, that 'twill be very inconsiderate and fallacious to conclude (except where the Opinions are precisely Contradictory) the Truth of one from the falsity of another. And in our particular case 'tis no way necessary, that the Properties of mixt Bodies must be explicable either by the Hermetical, or the *Aristotelian Hypothesis*; there being divers other and more plausible waies of explaining them, and especially that, which deduces qualities from the motion, figure, and contrivance of the small parts of Bodies; as I think might be shewn, if the attempt were

were as seasonable, as I fear it would be Tedious.

I will allow then, that the Chymists do not causelessly accuse the Doctrine of the four Elements of incompetency to explain the Properties of Compound bodies. And for this Rejection of a Vulgar Error, they ought not to be deny'd what praise men may deserve for exploding a Doctrine whose Imperfections are so conspicuous, that men need-ed but not to shut their Eyes, to discover them. But I am mistaken, if our Hermetical Philosophers Themselves need not, as well as the Peripateticks, have Recourse to more Fruitfull and Comprehensive Principles than the *Tria Prima*, to make out the Properties of the Bodies they converse with. Not to accumulate Examples to this purpose, (because I hope for a fitter opportunity to prosecute this Subject) let us at present only point at Colour, that you may guess by what they say of so obvious and familiar a Quality, how little Instruction we are to expect from the *Tria Prima* in those more abstruse ones, which they with the *Aristotelians* stile Occult. For about Colours, neither

*De Conf.
& diffen-
cap. 11.
pag. 186.*

ther do they at all agree among themselves, nor have I met with any one, of which of the three Perswasions soever, that does intelligibly explicate Them. The Vulgar Chymists are wont to ascribe Colours to Mercury; *Paracelsus* in divers places attributes them to Salt; and *Sennertus*, having recited their differing Opinions, Dissents from both; and referrs Colours rather unto Sulphur. But how Colours do, nay, how they may, arise from either of these Principles, I think you will scarce say that any has yet intelligibly explicated. And if *Mr. Boyle* will allow me to shew you the Experiments which he has collected about Colours, you will, I doubt not, confess that bodies exhibite colours, not upon the Account of the Predominancy of this or that Principle in them, but upon that of their Texture, and especially the Disposition of their superficial parts, whereby the Light rebounding thence to the Eye is so modifi'd, as by differing Impressions variously to affect the Organs of Sight. I might here take notice of the pleasing variety of Colours exhibited by the Triangular glafs (as 'tis wont to be call'd) and demand,

mand, what addition or decrement of either Salt, Sulphur, or Mercury, befalls the Body of the Glass by being Prismatically figur'd; and yet 'tis known, that without that shape it would not afford those colours as it does. But because it may be objected, that these are not real, but apparent Colours; that I may not lose time in examining the Distinction, I will alledge against the Chymists, a couple of examples of Real and Permanent Colours Drawn from Metalline Bodies; and represent, that without the addition of any extraneous body, Quicksilver may by the Fire alone, and that in glasse Vessels, be depriv'd of its silver like Colour, and be turn'd into a red Body; and from this red Body without Addition likewise may be obtain'd a Mercury bright and Specular as it was before; So that I have here a lasting Colour Generated and Destroy'd (as I have seen) at pleasure, without adding or taking away either Mercury, Salt, or Sulphur; and if you take a clean and slender piece of harden'd steel, and apply to it the flame of a candle at some little distance short of the point, You shall not have held
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the Steel long in the flame, but You shall perceive divers Colours, as Yellow, Red and Blew, to appear upon the Surface of the metal, and as it were run along in chase of one another towards the point; So that the same body, and that in one and the same part, may not only have a new colour produc'd in it, but exhibite successively divers Colours within a minute of an hour, or thereabouts; and any of these Colours may by Removing the Steel from the Fire, become Permanent, and last many years. And this Production and Variety of Colours cannot reasonably be suppos'd to proceed from the Accession of any of the three Principles, to which of them soever Chymists will be pleas'd to ascribe Colours; especially considering, that if you but suddenly Refrigerate that Iron, first made Red hot, it will be harden'd and Colourless again; and not only by the Flame of a Candle, but by any other equivalent heat Conveniently appli'd, the like Colours will again be made to appear and succeed one another, as at the First. But I must not any further prosecute an Occasional Discourse, though
that

that were not so Difficult for me to do, as I fear it would be for the Chymists to give a better Account of the other Qualities, by their Principles, than they have done of Colours. And your *Sennertus* Himself (though an Author I much value) would I fear have been exceedingly puzl'd to resolve, by the *Tria Prima*, halfe that Catálogue of Problems, which he challenges the Vulgar Peripateticks to explicate by their four Elements. And supposing it were true, that Salt or Sulphur were the Principle to which this or that Quality may be peculiarly referr'd, yet though he that teaches us this, teaches us something concerning That quality, yet he Teaches us but something. For indeed he does not Teach us That which can in any Tolerable measure satisfie an inquisitive Searcher after Truth. For what is it to me to know, that such a quality resides in such a Principle or Element, whilst I remain altogether ignorant of the Cause of that quality, and the manner of its production and Operation? How little do I know more than any Ordinary Man of Gravity, if I know but that the Heaviness of mixt bodies

*Sennert. de
Consens. &
Dissens.
pag. 165.
166.*

bodies proceeds from that of the Earth they are compos'd of, if I know not the reason why the Earth is Heavy? And how little does the Chymist teach the Philosopher of the Nature of Purgation, if he only tells him that the Purgative Vertue of Medicines resides in their Salt? For, besides that this must not be conceded without Limitation, since the purging parts of many Vegetables Extracted by the Water wherein they are infus'd, are at most but such compounded Salts, (I mean mingl'd with Oyle, and Spirit, and Earth, as Tartar and divers other Subjects of the Vegetable Kingdom afford) And since too that Quicksilver precipitated either with Gold, or without Addition, into a powder, is wont to be strongly enough Cathartical, though the Chymists have not yet prov'd, that either Gold or Mercury have any Salt at all, much less any that is Purgative; Besides this, I say, how little is it to me, to know That 'tis the Salt of the Rhubarb (for Instance) that purges, if I find That it does not purge as Salt; since scarce any Elementary Salt is in small quantity Cathartical. And if I know not how pur-

Purgation in general is effected in a Humane Body? In a word, as 'tis one thing to know a mans Lodging, and another, to be acquainted with him; so it may be one thing to know the subject wherein a Quality principally resides, and another thing to have a right notion and knowledg of the quality it self. Now that which I take to be the reason of this Chymical Deficiency, is the same upon whose account I think the *Aristotelian* and divers other Theories incompetent to explicate the Origine of Qualities. For I am apt to think, that men will never be able to explain the *Phænomena* of Nature, while they endeavour to deduce them only from the Presence and Proportion of such or such matèrial Ingredients, and consider such ingredients or Elements as Bodies in a state of rest; whereas indeed the greatest part of the affections of matter, and consequently of the *Phænomena* of nature, seems to depend upon the motion and the contrivance of the small parts of Bodies. For 'tis by motion that one part of matter acts upon another; and 'tis, for the most part, the texture of the Body upon which the moving parts strike, that modifies y^e

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motion

motion or Impression, and concurs with it to the production of those Effects which make up the chief part of the Naturalists Theme.

But (saies *Eleutherius*) me thinks for all this, you have left some part of what I alledg'd in behalf of the three principles, unanswer'd. For all that you have said will not keep this from being a useful Discovery, that since in the Salt of one Concrete, in the Sulphur of another, and the Mercury of a third, the Medicinal vertue of it resides; that Principle ought to be separated from the rest, and there the desired faculty must be sought for.

I never denyed (Replies *Carneades*) that the Notion of the *Tria Prima* may be of some use, but (continues he laughing) by what you now alledg for it, it will but appear, That it is useful to Apothecaries, rather than to Philosophers: The being able to make things Operative being sufficient to those, whereas the Knowledge of Causes is the Thing looked after by These. And let me Tell You, *Eleutherius*, even this itself will need to be entertained with some caution.

For

For first, it will not presently follow, That if the Purgative or other virtue of a Simple may be easily extracted by Water or Spirit of Wine, it Resides in the Salt or Sulphur of the Concrete; Since unless the Body hath before been resolved by the Fire, or some Other Powerful Agent, it will, for the most part, afford in the Liquors I have named, rather the finer compounded parts of it self, Than the Elementary ones. As I noted before, That Water will dissolve not only pure Salts, but Chrystals of Tartar, Gumme Arabick, Myrrhe and Other Compound Bodies. As also Spirit of Wine will Dissolve not only the pure Sulphur of Concretes, but likewise the whole Substance of divers Resinous Bodies, as Benzoin, the Gum-mous parts of Jalap, Gumme Lacca, and Other bodies that are counted perfectly Mixt. And we see that the Extracts made either with Water or Spirit of Wine are not of a simple and Elementary Nature, but Masses consisting of the looser Corpuscles, and finer parts of the Concretes whence they are Drawn; since by Distillation they may be Divided into more Elementary substances.

Next, we may consider That even when there intervenes a Chymical resolution by the Fire, 'tis seldom in the Saline or Sulphureous principle, as such, that the desir'd Faculty of the Concrete Resides; But, as that Titular Salt or Sulphur is yet a mixt Body, though the Saline or Sulphureous Nature be predominant in it. For, if in Chymical Resolutions the separated Substances were pure and simple Bodies, and of a perfect Elementary Nature; no one would be indued with more Specifick Vertues, than another; and their qualities would Differ as Little as do those of Water. And let me add this upon the by, That even Eminent Chymists have suffer'd themselves to be reprehended by me for their over great Diligence in purifying some of the things they obtain by Fire from mixt Bodies. For though such compleatly purifyed Ingredients of Bodies might perhaps be more satisfactory to our Understanding; yet others are often more useful to our Lives; the efficacy of such Chymical Productions depending most upon what they retain of the Bodies whence they are separated, or gain by the new associations of the Dissipated

sipated among themselves; whereas if they were meerly Elementary, their uses would be comparatively very small; and the vertues of Sulphurs, Salts, or Other such Substances of one denomination, would be the very same.

And by the Way (*Eleutherius*) I am inclin'd upon this ground to Think, That the artificial resolution of compound bodies by Fire does not so much enrich mankind, as it divides them into their supposed Principles; as upon the score of its making new compounds by new combinations of the dissipated parts of the resolv'd Body. For by this means the Number of mixt Bodies is considerably increased; And many of those new productions are endow'd with useful qualities; divers of which they owe not to the body from which they were obtain'd, but to Their newly Acquired Texture.

But thirdly, that which is principally to be Noted is this, that as there are divers Concretes, whose Faculties reside in some one or other of those differing Substances, that Chymists call their Sulphurs, Salts, and Mercuries, and consequently may be best obtain'd, by ana-

lyzing the Concrete whereby the desired Principles may be had sever'd or freed from the rest; So there are others wherein the noblest properties lodge not in the Salt, or Sulphur, or Mercury, but depend immediately upon the form, or (if you will) result from the determinate structure of the Whole Concrete; and consequently they that go about to extract the Vertues of such Bodies, by exposing them to the Violence of the Fire, do exceedingly mistake, and take the way to Destroy what they would obtain.

I remember that *Helmont* himself somewhere confesses, That as the Fire betters some things and improves their Vertues, so it spoyles others and makes them degenerate. And elsewhere he judiciously affirms, that there may be sometimes greater vertue in a simple, such as Nature has made it, than in any thing that can by the fire be separated from it. And lest you should doubt whether he means by the vertues of things those that are Medical; he has in one place this ingenuous confession; *Credo* (saies he) *simplicia in sua simplicitate esse sufficientia pro sanatione omnium morborum*

Helmont.
Pharm. &
Dispens.
Nov. pag.
498.

borum. Nay, Barthius, even in a comment upon *Beguinus*, scruples not to make this acknowledgment; *Valde absurdum est* (saies he) *ex omnibus rebus extracta facere*, Vide Jer. ad Begu. Lib. 1. Cap. 17. *salia, quintas essentias; præsertim ex sub-*stantiis per se plane vel subtilibus vel homogeneis, quales sunt Uniones, Corallia, Moscus, Ambra, &c. Consonant'y whereunto he also tells Us, (and Vouches the famous *Platerus*, for having candidly given the same Advertisement to his Auditors,) that some things have greater vertues, and better suited to our humane nature, when unprepar'd, than when they have past the Chymists Fire; as we see, saies my Author, in Pepper; of which some grains swallowed perform more towards the relief of a Distemperd stomach, than a great quantity of the Oyle of the same spice.

It has been (pursues *Carneades*) by our Friend here present observ'd concerning Salt-petre, that none of the substances into which the Fire is wont to divide it, retaines either the Taste, the cooling vertue, or some other of the properties of the Concrete; and that each of those Substances acquires new qualities not to be found in Salt-Petre it self. The

shining property of the tayls of glow-worms does survive but so short a time the little animal made conspicuous by it, that inquisitive men have not scrupled publickly to deride *Baptista Porta* and others; who, deluded perhaps with some Chymical surmises, have ventur'd to prescribe the distillation of a Water from the rayles of Glowwormes, as a sure way to obtain a liquor shining in the Dark. To which I shall now add no other example than that afforded us by Amber; which, whilst it remains an intire body, is endow'd with an Electrical faculty of drawing to it self feathers, strawes, and such like Bodies; which I never could observe either in its Salt, its Spirit, its Oyle, or in the Body I remember I once made by the reunion of its divided Elements; none of these having such a Texture as the intire Concrete. And however Chymists boldly deduce such and such properties from this or that proportion of their component Principles; yet in Concretes that abound with this or that Ingredient, 'tis not alwaies so much by vertue of its presence, nor its plenty, that the Concrete is qualify'd to perform such and such Effects; as upon the

account

account of the particular texture of that and the other Ingredients, associated after a determinate Manner into one Concrete: though possibly such a proportion of that ingredient may be more convenient than another for the constituting of such a body. Thus in a clock the hand is mov'd upon the Dyal, the bell is struck, and the other actions belonging to the engine are perform'd, not because the Wheels are of brass or iron, or part of one metal and part of another, or because the weights are of Lead, but by Vertue of the size, shape, bigness, and co-aptation of the several parts; which would performe the same things though the wheels were of Silver, or Lead, or Wood, and the Weights of Stone or Clay; provided the Fabrick or Contrivance of the engine were the same: though it be not to be deny'd, that Brass and Steel are more convenient materials to make clock-wheels of than Lead, or Wood. And to let you see, *Eleutherius*, that 'tis sometimes at least, upon the Texture of the small parts of a body, & not alwaies upon the presence, or recess, or increase, or Decrement of any one of its Principles, that it may loose some such

such Qualities, and acquire some such others as are thought very strongly inherent to the bodies they Reside in; I will add to what may from my past discourse be referr'd to this purpose, this Notable Example, from my Own experience; That Lead may without any additament, and only by various applications of the Fire, lose its colour; and acquire sometimes a gray, sometimes a yellowish, sometimes a red, sometimes an *amethystine* colour; and after having past through these, and perhaps divers others, again recover its leaden colour, and be made a bright Body. That also this Lead, which is so flexible a metal, may be made as brittle as Glasse, and presently be brought to be again flexible and Malleable as before. And besides, that the same lead, which I find by *Microscopes* to be one of the most opacous bodies in the World, may be reduced to a fine transparent glass; whence yet it may return to an opacous Nature again; and all this, as I said, without the addition of any extraneous body, and meerly by the manner and Method of exposing it to the Fire.

But (saies *Carneades*) after having already

already put you to so prolix a trouble, it is time for me to relieve you with a promise of putting speedily a period to it; And to make good that promise, I shall from all that I have hitherto discoursed with you, deduce but this one proposition by way of Corollary. [*That it may as yet be doubted, whether or no there be any determinate Number of Elements ; Or, if you please, whether or no all compound bodies, do consist of the same number of Elementary ingredients or material Principles.*]

This being but an inference from the foregoing Discourse, it will not be requisite to insist at large on the proofs of it; But only to point at the chief of Them, and Referr You for Particulars to what has been already Delivered.

In the First place then, from what has been so largely discours'd, it may appear, that the Experiments wont to be brought, whether by the common Peripateticks, or by the vulgar Chymists, to demonstrate, that all mixt bodies are made up precisely either of the four Elements, or the three Hypostatical Principles, do not evince what they are alledg'd to prove. And as for the other
common

common arguments, pretended to be drawn from Reason in favour of the *Aristotelian Hypothesis* (for the Chymists are wont to rely almost altogether upon Experiments) they are Commonly grounded upon such unreasonable or precarious Suppositions, that 'tis altogether as easie and as just for any man to reject them, as for those that take them for granted to assert them, being indeed all of them as indemonstrable as the conclusion to be inferr'd from them; and some of them so manifestly weak and prooflesse; that he must be a very courteous adversary, that can be willing to grant them; and as unskilful a one, that can be compelled to do so.

In the next place, it may be considered, if what these Patriarchs of the *Spagyrist*s, *Paracelsus* and *Helmont*, do on divers occasions positively deliver, be true; namely that the *Alkabeſt* does Resolve all mixt Bodies into other Principles than the fire, it must be decided which of the two resolutions (that made by the *Alkabeſt*, or that made by the fire) shall determine the number of the Elements, before we can be certain how many there are.

And

And in the mean time, we may take notice in the last place, that as the distinct substances whereinto the *Alkabeſt* divides bodies, are affirm'd to be differing in nature from those whereunto they are wont to be reduc'd by fire; and to be obtain'd from some bodies more in Number than from some others;

Novi saxum & lapides omnes in merum ſalem ſuo ſaxo aut lapidi & aequiponderantem reducere abſque omni prorsus ſulphure aut Mercurio.
Helmont. pag. 490.

ſince he tells us, he could totally reduce all ſorts of Stones into Salt only, whereas of a coal he had two diſtinct Liquors. So, although we ſhould acquieſce in that reſolution which is made by fire, we find not that all mixt bodies are thereby divided into the ſame number of Elements and Principles; ſome Concretes affording more of them than others do; Nay and ſometimes this or that Body affording a greater number of Differing ſubſtances by one way of management, than the ſame yeelds by another. And they that out of Gold, or Mercury, or Muſcovy-glaſs, will draw me as many diſtinct ſubſtances, as I can ſeparate from Vitriol, or from the juice of Grapes variously order'd, may teach me that which I ſhall
very

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very Thankfully learn. Nor does it appear more congruous to that variety that so much conduceth to the perfection of the Universe, that all Elemented bodies be compounded of the same number of Elements, than it would be for a language, that all its words should consist of the same number of Letters.

THE



T H E
SCEPTICAL CHYMIST

O R ,

*A Paradoxical Appendix to
the Foregoing Treatise.*

The Sixth Part.

H E R E *Carneades* having Dispatch't
what he Thought Requisite to op-
pose against what the Chymists are
wont to alledge for Proof of their three
Principles, Paus'd a while, and look'd
about him, to discover whether it were
Time for him and his Friend to Re-
joyne the Rest of the Company. But
Eleutherius perceiving nothing yet to
forbid

forbid Them to Prosecute their Discourse a little further, said to his Friend, (who had likewise taken Notice of the same thing) I halfe expected, *Carneades*, that after you had so freely declar'd Your doubting, whether there be any Determinate Number of Elements, You would have proceeded to question whether there be any Elements at all. And I confess it will be a trouble to me if You defeat me of my Expectation; especially since you see the leasure we have allow'd us may probably suffice to examine that Paradox; because you have so largely Deduc'd already many Things pertinent to it, that you need but intimate how you would have them Apply'd, and what you would inferr from them.

Carneades having in Vain represented that their leasure could be but very short, that he had already prated very long, that he was unprepar'd to maintain so great and so invidious a Paradox, was at length prevail'd with to tell his Friend; Since, *Eleutherius*, you will have me Discourse *Ex Tempore* of the Paradox you mention, I am content, (though more perhaps to express my Obedi-

Obedience, than my Opinion) to tell you that (supposing the Truth of *Helmonts* and *Paracelsus's* Alkahestical Experiments, if I may so call them) though it may seem extravagant, yet it is not absurd to doubt, whether, for ought has been prov'd, there be a necessity to admit any Elements, or Hypostatical Principles, at all.

And, as formerly, so now, to avoid the needless trouble of Disputing severally with the *Aristotelians* and the Chymists, I will address my self to oppose them. I have last nam'd, Because their Doctrine about the Elements is more applauded by the Moderns, as pretending highly to be grounded upon Experience. And, to deal not only fairly but favourably with them, I will allow them to take in Earth and Water to their other Principles. Which I consent to the rather, that my Discourse may the better reach the Tenents of the Peripateticks; who cannot plead for any so probably as for those two Elements; that of fire above the Air being Generally by Judicious Men exploded as an Imaginary thing; And the Air not concurring to compose Mixt

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bodies

Bodies as one of their Elements, but only lodging in their pores, or rather replenishing, by reason of its Weight and Fluidity, all those Cavities of bodies here below, whether compounded or not, that are big enough to admit it, and are not fill'd up with any grosser substance.

And, to prevent mistakes, I must advertize You, that I now mean by Elements, as those Chymists that speak plainest do by their Principles, certain Primitive and Simple, or perfectly unmingled bodies; which not being made of any other bodies, or of one another, are the Ingredients of which all those call'd perfectly mixt Bodies are immediately compounded, and into which they are ultimately resolved: now whether there be any one such body to be constantly met with in all, and each, of those that are said to be Elemented bodies, is the thing I now question.

By this State of the controversie you will, I suppose, Guess, that I need not be so absurd, as to deny that there are such bodies as Earth, and Water, and Quicksilver, and Sulphur: But I look upon Earth and Water, as component parts
of

of the Universe, or rather of the Terrestrial Globe, not of all mixt bodies. And though I will not peremptorily deny that there may sometimes either a running Mercury, or a Combustible Substance be obtain'd from a Mineral, or even a Metal; yet I need not Concede either of them to be an Element in the sense above declar'd; as I shall have occasion to shew you by and by.

To give you then a brief account of the grounds I intend to proceed upon, I must tell you, that in matters of Philosophy, this seems to me a sufficient reason to doubt of a known and important proposition, that the Truth of it is not yet by any competent proof made to appear. And congruously hereunto, if I shew that the grounds, upon which men are perswaded that there are Elements, are unable to satisfy a considering man, I suppose my doubts will appear rational.

Now the Considerations that induce men to think, that there are Elements, may be conveniently enough referr'd to two heads. Namely, the one, that it is necessary that Nature make use of Elements to constitute the bodies that

are reputed Mixt. And the other, That the Resolution of such bodies manifests that nature had compounded them of Elementary ones.

In reference to the former of these Considerations, there are two or three things that I have to Represent.

And I will begin with reminding you of the Experiments I not long since related to you concerning the growth of pumpions, mint, and other vegetables out of fair water. For by those experiments it seems evident, that Water may be Transmuted into all the other Elements; from whence it may be inferr'd; both, That this not every Thing Chymists will call Salt, Sulphur, or Spirit, that needs alwaies be a Primordiate and Ingenerable body. And, that Nature may context a Plant (though that be a perfectly mixt Concrete) without having all the Elements previously presented to her to compound it of. And, if you will allow the relation I mention'd out of *Monsieur De Rochas* to be True; then may not only plants, but Animals and Minerals too, be produced out of Water. And, however there is little doubt to be made, but that the plants my tryals afforded me,

as they were like in so many other respects to the rest of the plants of the same Denomination; so they would, in case I had reduc'd them to putrefaction, have likewise produc'd Wormes or other insects, as well as the resembling Vegetables are wont to do; so that Water may, by Various Seminal Principles, be successively Transmuted into both plants and Animals. And if we consider that not only Men, but even sucking Children are, but too often, Tormented with Solid Stones; and that divers sorts of Beasts themselves, (whatever *Helmont* against Experience think to the contrary) may be Troubled with great and Heavy stones in their Kidneys and Bladders, though they Feed but upon Grass and other Vegetables, that are perhaps but Disguised Water, it will not seem improbable that even some Concretes of a mineral Nature, may Likewise be form'd of Water.

We may further take notice, that as a Plant may be nourish'd, and consequently may Consist of Common water; so may both plants and Animals; (perhaps even from their Seminal Rudiments) consist of compound Bodies,

without having any thing meerly Elementary brought them by nature to be compounded by them: This is evident in divers men, who whilst they were Infants were fed only with Milk, afterwards Live altogether upon Flesh, Fish, Wine, and other perfectly Mixt Bodies. It may be seen also in sheep, who on some of our English Downs or Plains, grow very fat by feeding upon the grass, without scarce drinking at all. And yet more manifestly in the magots that breed and grow up to their full bignesse within the pulps of Apples, Pears, or the like Fruit. We see also, that Dungs that abound with a mixt Salt give a much more speedy increment to Corn and other Vegetables, than Water alone would do: And it hath been assur'd me, by a man experienc'd in such matters, that sometimes when to bring up roots very early, the Mould they were planted in was made over-rich, the very substance of the Plant has tasted of the Dung. And let us also consider a Graft of one kind of Fruit upon the upper bough of a Tree of another kind. As (for instance) the Scion of a Pear upon a White-thorne; for there the ascending
Liquor

Liquor is already alter'd, either by the root, or in its ascent by the bark, or both wayes, and becomes a new mixt body: as may appear by the differing qualities to be met with in the saps of several trees; as particularly, the medicinal virtue of the Birch-Water, which I have sometimes drunk upon *Helmonts* great and not undeserved commendation. Now the graft, being fasten'd to the stock, must necessarily nourish its self, and produce its Fruit, only out of this compound Juice prepared for it by the stock, being unable to come at any other aliment. And if we consider, how much of the Vegetable he feeds upon may (as we noted above) remain in an Animal; we may easily suppose, That the blood of that Animal who Feeds upon this, though it be a Well constituted Liquor, and have all the differing Corpuscles, that make it up, kept in order by one presiding form, may be a strangely Decomposed Body, many of its parts being themselves Decomposed. So little is it Necessary that even in the mixtures which nature her self makes in Animal and Vegetable Bodies, she should have pure Elements at hand to make her compositions of.

Having said thus much touching the constitution of Plants and Animals, I might perhaps be able to say as much touching that of Minerals, and even Metals, if it were as easy for us to make experiment in Order to the production of these, as of those. But the growth or increment of Minerals being usually a work of excessively long time, and for the most part perform'd in the bowels of the Earth, where we cannot see it, I must instead of Experiments make use, on this occasion, of Observations.

That stones were not all made at once, but that some of them are now a dayes generated, may (though it be deny'd by some) be fully prov'd by several examples, of which I shall now scarce alledg any other, than that famous place in *France* known by the name of *Les Caves Goutieres*, where the Water falling from the upper Parts of the cave to the ground does presently there condense into little stones, of such figures as the drops, falling either severally or upon one another, and coagulating presently into stone, chance to exhibit. Of these stones some Ingenious Friends of ours, that went a while since to visit that place, did me

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the favour to present me with some that they brought thence. And I remember that both that sober Relator of his Voyages, *Van Linschoten*, and another good Author, inform us that in the Diamond Mines (as they call them) in the *East-Indies*, when having dig'd the Earth, though to no great depth, they find Diamonds and take them quite away; Yet in a very few years they find in the same place new Diamonds produc'd there since. From both which Relations, especially the first, it seems probable that Nature does not alwaies stay for divers Elementary Bodies, when she is to produce stones. And as for Metals themselves, Authors of good note assure us, that even they were not in the beginning produc'd at once altogether, but have been observ'd to grow; so that what was not a Mineral or Metal before, became one afterwards. Of this it were easie to alledg many testimonies of professed Chymists. But that they may have the greater authority, I shall rather present you with a few borrowed from more unsuspected writers. *Sulphuris Mineram* (as the inquisitive *P. Fallopius* notes) *quæ nutritrix est caloris subterranei fabri*

fabri seu Archæi fontium & mineralium; Infra terram citissimè renasci testantur Historia Metallica. Sunt enim loca è quibus si hoc anno sulphur effossam fuerit; intermissa fossione per quadriennium redeunt fossores & omnia sulphure, ut antea, rursus inveniunt plena. Pliny Relates, In Italiæ Insula Ilva, gigni ferri metallum. Strabo multo expressius; effossam ibi metallum semper regenerari. Nam si effossio spatio centum annorum intermittebatur, & iterum illuc revertebantur, fossores reperisse maximam copiam ferri regeneratam. Which history not only is countenanced by Fallopius, from the Incom which the Iron of that Island yeelded the Duke of Florence in his time; but is mention'd more expressly to our purpose, by the Learned Cesalpinus. Vena (saies he) ferri copiosissima est in Italia; ob eam nobilitata Ilva Tyrrheni maris Insula incredibili copia etiam nostris temporibus eam gignens: Nam terra quæ eruitur, dum vena offoditur tota, procedente tempore in venam convertitur. Which last clause is therefore very notable, because from thence we may deduce, that earth, by a Metalline plastick principle latent in it, may be in proceſſe of time chang'd into a metal. And even Agricola

agricola himself, though the Chymists complain of him as their adversary, acknowledges thus much and more; by telling us that at a Town called *Saga* in Germany, they dig up Iron in the Fields, by sinking ditches two foot deep;

In Lygiis, ad Sagam oppidum; in pratis cruitur ferrum, fossis ad altitudinem bipedaneam ætis. Id decennio renatum denuo foditur non aliter ac Ilvæ ferrum.

And adding, that within the space of ten years the Ditches are digged again for Iron since produced, As the same Metal is wont to be obtain'd in *Ilva*. Also concerning Lead, not to mention what even *Galen* notes, that it will increase both in bulk and Weight if it be long kept in Vaults or Sellers, where the Air is gross and thick, as he collects from the swelling of those pieces of Lead that were imploy'd to fasten together the parts of old Statues. Not to mention this, I say, *Boccacius Certaldus*, as I find him Quoted by a Diligent Writer, has this Passage touching the Growth of Lead. *Fessularum mons* (saies he) in *Hetruria*, *Florentiæ civitati imminens*, *lapides plumbarios habet; qui si excidantur, brevi temporis spatio, novis incrementis instaurantur; ut* (annexes my Author) *tradit Boccacius Certaldus, qui*
id



id compertissimum esse scribit. Nihil hoc novi est; sed de eodem Plinius, lib. 34. Hist. Natur. cap. 17. dudum prodidit, Inquiens, mirum in his solis plumbi metallis, quod derelicta fertilius reviviscunt. In plumbariis secundo Lapide ab Amberga dictis ad Asylum recrementa congesta in cumulos, exposita solibus pluviisque paucis annis, reddunt suum metallum cum fœnore. I might Add to these, (continues Carneades) many things that I have met with concerning the Generation of Gold and Silver. But for fear of wanting time, I shall mention but two or three Narratives. The First you may find Recorded by Gerhardus the Physick Professor, in these Words. In valle (saies he) Joachimica argentum graminis modo & more è Lapidibus mineræ velut è radice excrevisse digiti Longitudine, testis est Dr. Schreterus, qui ejusmodi venas aspectu jucundas & admirabiles Domi suæ aliis sæpe monstravit & Donavit. Item Aqua cærulea Inventa est Annebergæ, ubi argentum erat adhuc in primo ente, quæ coagulata redacta est in calcem fixi & boni argenti..

The other two Relations I have not met with in Latine Authors, and yet they

they are both very memorable in themselves, and pertinent to our present purpose.

The first I meet with in the Commentary of *Johannes Valehius* upon the *Kleine Baur*, in which that industrious Chymist Relates, with many circumstances, that at a Mine-Town (If I may so English the German *Bergstat*) eight miles or Leagues distant from *Strasburg* call'd *Mariakirch*, a Workman came to the Overseer, and desired employment; but he telling him that there was not any of the best sort at present for him, added that till he could be preferr'd to some such, he might in the mean time, to avoid idleness, work in a Grove or Mine-pit thereabouts, which at that time was little esteem'd. This Workman after some weeks Labour, had by a Crack appearing in the Stone upon a Stroak given near the wall, an Invitation Given him to Work his Way through, which as soon as he had done, his Eyes were saluted by a mighty stone or Lump which stood in the middle of the Cleft (that had a hollow place behind it) upright, and in shew like an armed-man; but consisted of pure fine
Silver.

Silver having no Vein or Ore by it, or any other Additament, but stood there free, having only underfoot something like a burnt matter; and yet this one Lump held in Weight above a 1000 marks, which, according to the Dutch Account, makes 500 pound weight of fine silver. From which and other Circumstances my Author gathers; That by the warmth of the place, the Noble Metalline Spirits, (Sulphureous and Mercurial) were carri'd from the neighbouring Galleries or Vaults, through other smaller Cracks and Clefts into that Cavity, and there collected as in a close Chamber or Cellar; whereinto when they were gotten, they did in process of time settle into the forementioned precious mass of Metal.

The other Germane Relation is of that great Traveller and Laborious Chymist *Johannes* (not *Georgius*) *Agricola*; who in his notes upon what *Poppinus* has written of Antimony, Relates, that when he was among the *Hungarian* Mines in the deep Groves, he observ'd that there would often arise in them a warm Steam, (not of that malignant sort which the Germans call *Schwadt*, which

which (saies he) is a meer poyson, and often suffocates the Diggers) which fasten'd it self to the Walls; and that coming again to review it after a couple of dayes, he discern'd that it was all very fast, and glistering; whereupon having collected it and Distill'd it *per Retortam*, he obtain'd from it a fine Spirit: adding, that the Mine-Men inform'd him, that this Steam, or Damp (as the English Men also call it, retaining the Dutch Term) would at last have become a Metal, as Gold or Silver.

I referr (saies *Carneades*) to another Occasion, the Use that may be made of these Narratives towards the explicating the Nature of Metalls; and that of Fixtness, Malleableness, and some other Qualities conspicuous in them. And in the mean time, this I may at present deduce from these Observations; That 'tis not very probable, that, whenever a Mineral, or even a Metal, is to be Generated in the Bowels of the Earth, Nature needs to have at hand both Salt, and Sulphur, and Mercury to Compound it of; for, not to urge that the two last Relations seem less to favour the Chymists than *Aristotle*, who would

would have Metals Generated of certain *Halitus* or steams, the foremention'd Observations together, make it seem more Likely that the mineral Earths or those Metalline steams (where with probably such Earths are plentifully imbu'd) do contain in them some seminal Rudiment, or some thing Equivalent thereunto; by whose plastick power the rest of the matter, though perhaps Terrestrial and heavy, is in Tract of time fashion'd into this or That metalline Ore; almost (as I formerly noted) as that fair water was by the seminal Principle of Mint, Pompions, and other Vegetables, contriv'd into Bodies answerable to such Seeds. And that such Alterations of Terrestrial matter are not impossible, seems evident from that notable Practice of the Boylers of Salt-Petre, who unanimously observe, as well here in *England* as in other Countries, That if an Earth pregnant with Nitre be depriv'd, by the affusion of water, of all its true and dissoluble Salt, yet the Earth will after some years yeeld them Salt-Petre again; For which reason some of the eminent and skilfullest of them keep it in heaps as a perpetual

Mine

Mine of Salt Petre; whence it may appear, that the Seminal Principle of Nitre latent in the Earth does by degrees Transforme the neighbouring matter into a Nitrous Body; for though I deny that some Volatile Nitre may by such Earths be attracted (as they speak) out of the Air, yet that the innermost parts of such great heaps that lye so remote from the Air should borrow from it all the Nitre they abound with, is not probable, for other reasons besides the remoteness of the Air, though I have not the Leasure to mention them.

And I remember, that a person of Great Credit, and well acquainted with the wayes of making Vitriol, affirm'd to me, that he had observ'd, that a kind of mineral which abounds in that Salt, being kept within Doors and not expos'd (as is usual) to the free Air and Rains, did of it self in no very long time turn into Vitriol, not only in the outward or superficial, but even in the internal and most Central parts.

And I also remember, that I met with a certain kind of Marchasite that lay together in great Quantities under
Bb
ground,

ground, which did, even in my chamber, in so few hours begin of it self to turne into Vitriol, that we need not distrust the newly recited narrative. But to return to what I was saying of Nitre; as Nature made this Salt-Petre out of the once almost an inodorous Earth it was bread in, and did not find a very stinking and corrosive Acid Liquor, and a sharp Alcalizate Salt to compound it of, though these be the Bodies into which the Fire dissolves it; so it were not necessary that Nature should make up all Metals and other Minerals of Pre-existent Salt, and Sulphur, and Mercury, though such Bodies might by Fire be obtained from it. Which one consideration duly weigh'd is very considerable in the present controversy: And to this agree well the Relations of our two German Chymists; for besides that it cannot be convincingly prov'd, it is not so much as likely that so languid and moderate a heat as that within the Mines, should carry up to so great a height, though in the forme of fumes, Salt, Sulphur, and Mercury; since we find in our Distillations, that it requires a considerable Degree of Fire to raise so much as to the height

height of one foot not only Salt, but even Mercury it self, in close Vessels. And if it be objected, that it seems by the stink that is sometimes observ'd when Lightning falls down here below, that sulphureous steams may ascend very high without any extraordinary Degree of heat; It may be answer'd, among other things, that the Sulphur of Silver is by Chymists said to be a fixt Sulphur, though not altogether so well Digested as that of Gold.

But, (proceeds *Carneades*) If it had not been to afford You some hints concerning the Origine of Metals, I need not have deduc'd any thing from these Observations; It not being necessary to the Validity of my Argument that my Deductions from them should be irrefragable, because my Adversaries the *Aristotelians* and Vulgar Chymists do not, I presume, know any better than I, *a priori*, of what ingredients Nature compounds Metals and Minerals. For their Argument to prove that those Bodies are made up of such Principles, is drawn *a posteriori*; I mean from this, that upon the *Analysis* of Mineral bodies they are resolv'd into those differing substan-

ces. That we may therefore examine this Argument, Let us proceed to consider what can be alledg'd in behalf of the Elements from the Resolutions of Bodies by the fire; which you remember was the second Topick whence I told you the Arguments of my Adversaries were desum'd.

And that I may first dispatch what I have to say concerning Minerals, I will begin the remaining part of my discourse with considering how the fire divides them.

And first, I have partly noted above, that though Chymists pretend from some to draw salt, from others running Mercury, and from others a Sulphur; Yet they have not hitherto taught us by any way in use among them to separate any one principle, whether Salt, Sulphur, or Mercury, from all sorts of Minerals without exception. And thence I may be allow'd to conclude that there is not any of the Elements that is an Ingredient of all Bodies, since there are some of which it is not so.

In the next place, supposing that either Sulphur or Mercury were obtainable from all sorts of Minerals. Yet still this
Sulphur

Sulphur or Mercury would be but a compounded, not an Elementary body, as I told you already on another occasion. And certainly he that takes notice of the wonderful Operations of Quicksilver, whether it be common, or drawn from Mineral Bodies, can scarce be so inconsiderate as to think it of the very same nature with that immature and fugitive substance which in Vegetables & Animals Chymists have been pleas'd to call their Mercury. So that when Mercury is got by the help of the fire out of a metal or other Mineral Body, if we will not suppose that it was not pre-existent in it, but produc'd by the action of the fire upon the Concrete, we may at least suppose this Quicksilver to have been a perfect Body of its own kind (though perhaps less heterogeneous than more secondary mixts) which happen'd to be mingl'd *per minima*, and coagulated with the other substances, whereof the Metal or Mineral consisted. As may be exemplified partly by Native Vermilion wherein the Quicksilver and Sulphur being exquisitely blended both with one another, and that other coarse Mineral stuff (what ever it be) that harbours

Bb 3 them,

them, make up a red body differing enough from both; and yet from which part of the Quicksilver, and of the Sulphur, may be easily enough obtain'd; Partly by those Mines wherein nature has so curiously incorporated Silver with Lead, that 'tis extreamly difficult, and yet possible, to separate the former out of the Latter; And partly too by native Vitriol, wherein the Metalline Corpuscles are by skill and industry separable from the saline ones, though they be so con-coagulated with them, that the whole Concrete is reckon'd among Salts.

And here I further observe, that I never could see any Earth or Water, properly so call'd, separated from either Gold or Silver (to name now no other Metalline Bodies) and therefore to retort the argument upon my Adversaries, I may conclude, that since there are some bodies in which, for ought appears, there is neither Earth nor Water; I may be allow'd to conclude, that neither of those two is an Universal Ingredient of all those Bodies that are counted perfectly mixt, which I desire you would remember against Anon.

It

It may indeed be objected, that the reason why from Gold or Silver we cannot separate any moisture, is, because that when it is melted out of the Oar, the vehement Fire requisite to its Fusion forc'd away all the aqueous and fugitive moisture; and the like fire may do from the materials of Glafs. To which I shall Answer, that I Remember I read not long since in the Learned *Josepbus Acosta*, who relates it upon his own observation; that in *America* (where he long lived) there is a kind of Silver which the *Indians* call *Papas*, and sometimes (saies he) they find pieces very fine and pure like to small round roots, the which is rare in that metal, but usual in Gold; Concerning which metal he tells us, that besides this they find some which they call Gold in grains, which he tells us are small morsells of Gold that they find whole without mixture of any other metal, which hath no need of melting or Refining in the fire.

Acosta
Natural
and Moral
history of
the Indies,
L. 3. c. 5. p.
212.

I remember that a very skilful and credible person affirmed to me, that being in the *Hungarian* mines he had the good fortune to see a mineral that was

there digg'd up, wherein pieces of Gold of the length, and also almost of the bigness of a humane Finger, grew in the Oar, as if they had been parts and Branches of Trees.

And I have my self seen a Lump of whitish Mineral, that was brought as a Rarity to a Great and knowing Prince, wherein there grew here and there in the Stone, which looked like a kind of sparr, divers little Lumps of fine Gold, (for such I was assured that Tryal had manifested it to be) some of them Seeming to be about the Bigness of pease.

But that is nothing to what our *Acosta* subjoynes, which is indeed very memorable, namely, that of the morsels of Native and pure Gold, which we lately heard him mentioning, he had now and then seen some that weighed many pounds; to which I shall add, that I my self have seen a Lump of Oar not long since digged up, in whose stony part there grew, almost like Trees, divers parcels though not of Gold, yet of (what perhaps Mineralists will more wonder at) another Metal which seemed to be very pure or un-

mixt

See *Acosta*
in the fore-
cited Place,
and the
passage of
Pliny quo-
ted by him.

mixt with any Heterogeneous Substances, and were some of them as big as my Finger, if not bigger. But upon Observations of this kind, though perhaps I could, yet I must not at present, dwell any longer.

To proceed Therefore now (saies *Carneades*) to the Consideration of the *Analysis* of Vegetables, although my Tryals give me no cause to doubt but that out of most of them five differing Substances may be obtain'd by the fire, yet I think it will not be so easily Demonstrated that these deserve to be call'd Elements in the Notion above explain'd.

And before I descend to particulars, I shall repeat and premise this General Consideration, that these differing substances that are call'd Elements or Principles, differ not from each other as Metals, Plants and Animals, or as such Creatures as are immediately produc'd each by its peculiar Seed, and Constitutes a distinct propagable sort of Creatures in the Universe; but these are only Various Schemes of matter or Substances that differ from each other, but in consistence (as Running Mercury and
the

the same Metal congeal'd by the Vapor of Lead) and some very few other accidents, as Taste, or Smell, or Inflammability, or the want of them. So that by a change of Texture not impossible to be wrought by the Fire and other Agents that have the Faculty, not only to dissociate the small parts of Bodies, but afterwards to connect them after a new manner, the same parcel of matter may acquire or lose such accidents as may suffice to Denominate it Salt, or Sulphur, or Earth. If I were fully to clear to you my apprehensions concerning this matter, I should perhaps be obliged to acquaint you with divers of the Conjectures (for I must yet call them no more) I have had Concerning the Principles of things purely Corporeal: For though because I seem not satisfi'd with the Vulgar Doctrines, either of the Peripatetick or Paracelsian Schooles, many of those that know me, (and perhaps, among Them, *Eleutherius* himself) have thought me wedded to the Epicurean *Hypothesis*, (as others have mistaken me for an *Helmontian*) yet if you knew how little Conversant I have been with *Epicurean* Authors,

Authors, and how great a part of *Lucretius* himself I never yet had the Curiosity to read, you would perchance be of another mind; especially if I were to entertain you at large, I say not, with my present Notions; but wth my former thoughts concerning the Principles of things. But, as I said above, fully to clear my Apprehensions would require a Longer Discourse than we can now have.

For, I should tell you that I have sometimes thought it not unfit, that to the Principles which may be assign'd to things, as the World is now Constituted, we should, if we consider the Great Mass of matter as it was whilst the Universe was in making, add another, which may Conveniently enough be call'd an Architectonick Principle or power; by which I mean those Various Determinations, and that Skilfull Guidance of the motions of the small parts of the Universal matter by the most wise Author of things, which were necessary at the beginning to turn that confus'd *Chaos* into this Orderly and beautiful World; and Especially, to contrive the Bodies of Animals

nimals and Plants, and the Seeds of those things whose kinds were to be propagated. For I confess I cannot well Conceive, how from matter, Barely put into Motion, and then left to it self, there could Emerge such Curious Fabricks as the Bodies of men and perfect Animals, and such yet more admirably Contriv'd parcels of matter, as the seeds of living Creatures.

I should likewise tell you upon what grounds, and in what sence, I suspected the Principles of the World, as it now is, to be Three, Matter, Motion and Rest. I say, *as the World now is*, because the present Fabrick of the Universe, and especially the seeds of things, together with the establish'd Course of Nature, is a Requisite or Condition, upon whose account divers things may be made out by our three Principles, which otherwise would be very hard, if possible, to explicate.

I should moreover declare in general (for I pretend not to be able to do it otherwise) not only why I Conceive that Colours, Odors, Tasts, Fluidness and Solidity, and those other qualities that Diversifie and Denominate Bodies
may

may Intelligibly be Deduced from these three; *but how two of the three* Epicurean Principles (which, I need not tell you, are Magnitude, Figure, and Weight) are Themselves Deducible from Matter and Motion; since the Latter of these Variouslly Agitating, and, as it were, Distracting the Former, must needs disjoyne its parts; which being Actually separated must Each of them necessarily both be of some Size, and obtain some shape or other. Nor did I add to our Principles the *Aristotelian Privation*, partly for other Reasons, which I must not now stay to insist on; and partly because it seems to be rather an Antecedent, or a *Terminus à quo*, than a True Principle, as the starting-Post is none of the Horses Legs or Limbs.

I should also explain why and how I made Rest, to be, though not so considerable a Principle of things, as Motion; yet a Principle of them; partly because it is (for ought we know) as Ancient at least as it, and depends not upon Motion, nor any other quality of matter; and partly, because it may enable the Body in which it happens to be,
both

both to continue in a State of Rest till some external force put it out of that state, and to concur to the production of divers Changes in the bodies that hit against it, by either quite stopping or lessning their Motion (whilst the body formerly at Rest Receives all or part of it into it self) or else by giving a new Byass, or some other Modification, to Motion, that is, To the Grand and Primary instrument whereby Nature produces all the Changes and other Qualities that are to be met with in the World.

I should likewise, after all this explain to you how, although Matter, Motion and Rest, seem'd to me to be the Catholick Principles of the Universe, I thought the Principles of Particular bodies might be Commodiously enough reduc'd to two, namely *Matter*, and (what Comprehends the two other, and their effects) the result, or Aggregate, or Complex of those Accidents, which are the Motion or Rest, (for in some Bodies both are not to be found) the Bigness, Figure, Texture, and the thence resulting Qualities of the small parts, which are necessary to intitle the Body where-
to

to they belong to this or that Peculiar Denomination; and discriminating it from others to appropriate it to a Determinate Kind of Things, (as Yellowness, Fixtness, such a Degree of Weight, and of Ductility, do make the Portion of matter wherein they Concur, to be reckon'd among perfect metals, and obtain the name of Gold) This Aggregate or result of Accidents you may if You please, call either *Structure*, or *Texture*, (Though indeed, that do not so properly Comprehend the motion of the constituent parts especially in case some of them be Fluid) or what other appellation shall appear most Expressive. Or if, retaining the Vulgar Terme, You will call it the *Forme* of the thing it denominates, I shall not much oppose it; Provided the word be interpreted to mean but what I have express'd, and not a Scholastick *Substantial Forme*, which so many intelligent men profess to be to them altogether Un-intelligible.

But, (saies *Carneades*) if you remember that 'tis a Sceptick speaks to you, and that 'tis not so much my present Talk to make assertions as to suggest doubts

doubts, I hope you will look upon what I have propos'd, rather as a Narrative of my former conjectures touching the Principles of things, than as a Resolute Declaration of my present opinions of them; especially since although they cannot but appear Very much to their Disadvantage, if you Consider Them as they are propos'd without those Reasons and Explanations by which I could perhaps make them appear much less extravagant; yet I want time to offer you what may be alledg'd to clear and countenance these notions; my design in mentioning them unto you at present being, partly, to bring some Light and Confirmation to divers passages of my discourse to you; partly to shew you, that I do not (as you seem to have suspected) embrace all *Epicurus* his principles; but Dissent from him in some main things, as well as from *Aristotle* and the Chymists, in others; and partly also, or rather chiefly, to intimate to you the grounds upon which I likewise differ from *Helmont* in this, that whereas he ascribes almost all things, and even diseases themselves, to their determinate Seeds; I am of opinion, that

besides

besides the peculiar Fabricks of the Bodies of Plants and Animals (and perhaps also of some Metals and Minerals) which I take to be Effects of seminal principles, there are many other bodies in nature which have and deserve distinct and Proper names, but yet do but result from such contextures of the matter they are made of, as may without determinate seeds be effected by heat, cold, artificial mixtures and compositions, and divers other causes which sometimes nature imployes of her own accord; and oftentimes man by his power and skill makes use of to fashion the matter according to his intentions. This may be exemplified both in the productions of Nature, and in those of Art; of the first sort I might name multitudes; but to shew how slight a variation of Textures without addition of new ingredients may procure a parcel of matter divers names, and make it be Lookt upon as Different Things;

I shall invite you to observe with me, That Clouds , Rain, Hail, Snow, Frost, and Ice , may be but water, having its parts varied as to their size and distance in respect of each other, and as to motion

and rest. And among Artificial Productions we may take notice (to skip the Chrystals of Tartar) of Glass, Regulus Martis Stellatus, and particularly of the Sugar of Lead, which though made of that insipid Metal and sowre Salt of Vinegar, has in it a sweetness surpassing that of common Sugar, and divers other qualities, which being not to be found in either of its two ingredients, must be confess'd to belong to the Concrete it self, upon the account of its Texture.

This Consideration premis'd, it will be, I hope, the more easie to perswade you that the Fire may as well produce some new textures in a parcel of matter, as destroy the old.

Wherefore hoping that you have not forgot the Arguments formerly imploy'd against the Doctrine of the *Tria Prima*; namely that the Salt, Sulphur, and Mercury, into which the Fire seems to resolve Vegetable and Animal Bodies, are yet compounded, not simple and Elementary Substances; And that (as appear'd by the Experiment of Pumpions) the *Tria prima* may be made out of Water; hoping I say, that you remember These and the other Things that I formerly represented

tented to the same purpose, I shall now add only, that if we doubt not the Truth of some of *Helmonts* Relations, We may well doubt whether any of these Heterogeneities be (I say not pre-existent, so as to convene together, when a plant or Animal is to be constituted, but) so much as in-existent in the Concrete whence they are obtain'd, when the Chymist first goes about to resolve it; For, not to insist upon the un-inflamable Spirit of such Concretes, because that may be pretended to be but a mixture of Phlegme and Salt; the Oyle or Sulphur of Vegetables or Animals is, according to him, reducible by the help of Lixivate Salts into Sope; as that Sope is by the help of repeated Distillations from a *Caput Mortuum* of Chalk into insipid Water. And as for the saline substance that seems separable from mixt bodies; the same *Helmonts* tryals give us cause to think, That it may be a production of the Fire which by transporting and otherwise altering the particles of the matter, does bring it to a Saline nature.

Omne autem Alkali addita pinguedine in aqueum liquorem, qui tandem mera & simplex aqua fit, reducitur, (ut videre est in Sapone, Lazurio lapide, &c.) quoties per adjuncta fixa semen Pinguedinis deponit. Helmont.

For I know (saies he, in the place formerly alledg'd to another purpose) a way to reduce all stones into a meer Salt of equal weight with the stone whence it was produc'd, and that without any of the least either Sulphur or Mercury; which asseveration of my Author would perhaps seem less incredible to You, if I durst acquaint You with all I could say upon that subject. And hence by the way you may also conclude that the Sulphur and Mercury, as they call them, that Chymists are wont to obtain from compound Bodies by the Fire, may possibly in many Cases be the productions of it; since if the same bodies had been wrought upon by the Agents employ'd by *Helmont*, they would have yeelded neither Sulphur nor Mercury; & those portions of them, which the Fire would have presented Us in the forme of Sulphureous and Mercurial Bodies, would have, by *Helmonts* method, been exhibited to us in the form of Salt.

But though (saies *Eleutherius*) You have alledg'd very plausible Arguments against the *tria Prima*, yet I see not how it will be possible for you to avoid acknowledging that Earth and Water are Ele-

Elementary Ingredients, though not of Mineral Concretes, yet of all Animal and Vegetable Bodies; Since if any of these of what sort soever be committed to Distillation, there is regularly and constantly separated from it a phlegme or aqueous part, and a *Caput Mortuum* or Earth.

I readily acknowledge (answers *Carneades*) it is not so easy to reject Water and Earth (and especially the former) as 'tis to reject the *Tria Prima*, from being the Elements of mixt Bodies; but 'tis not every difficult thing that is impossible.

I consider then, as to Water, that the chief Qualities which make men give that name to any visible Substance, are that it is Fluid or Liquid, and that it is insipid and inodorous. Now as for the tast of these qualities, I think you have never seen any of those separated substances that the Chymists call Phlegme which was perfectly devoid both of Tast and Smell: and if you object, that yet it may be reasonably suppos'd, that since the whole Body is Liquid, the mass is nothing but Elementary Water faintly imbu'd with some of the Saline or

Sulphureous parts of the same Concrete, which it retain'd with it upon its Separation from the Other Ingredients. To this I answer, That this Objection would not appear so strong as it is plausible, if Chymists understood the Nature of Fluidity and Compactness; and that, as I formerly observ'd, to a Bodies being Fluid there is nothing necessary, but that it be divided into parts small enough; and that these parts be put into such a motion among themselves as to glide some this way and some that way, along each others Surfaces. So that although a Concrete were never so dry, and had not any Water or other Liquor in-existent in it, yet such a Comminution of its parts may be made, by the fire or other Agents, as to turn a great portion of them into Liquor. Of this Truth I will give an instance, employ'd by our friend here present as one of the most conducive of his experiments to illustrate the nature of Salts. If you Take then sea salt, and melt it in the Fire to free it from the aqueous parts, and afterwards distill it with a vehement Fire from burnt Clay, or any other, as dry a *Caput Mortuum* as you please, you will, as Chymists confess
by

by teaching it, drive over a good part of the Salt in the form of a Liquor. And to satisfy some ingenious men, That a great part of this Liquor was still true sea salt brought by the Operation of the Fire into Corpuscles so small, and perhaps so advantageously shap'd, as to be capable of the forme of a Fluid Body, He did in my presence poure to such spiritual salts a due proportion of the spirit (or salt and Phlegme) of Urine, whereby having evaporated the superfluous moisture, he soon obtain'd such another Concrete, both as to tast and smell, and easie sublimableness as common Salt *Armoniack*, which you know is made up of gross and undistill'd sea salt united with the salts of Urine and of Soot, which two are very neer of kin to each other. And further, to manifest that the Corpuscles of sea salt and the Saline ones of Urine retain their several Natures in this Concrete, He mixt it with a convenient quantity of Salt of Tartar, and committing it to Distillation soon regain'd his spirit of Urine in a liquid form by its self, the sea salt staying behind with the Salt of Tartar. Wherefore it is very possible that dry Bodies may by

the Fire be reduc'd to Liquors without any separation of Elements, but barely by a certain kind of Dissipation and Comminution of the matter, whereby its parts are brought into a new state. And if it be still objected, that the Phlegme of mixt Bodies must be reputed water, because so weak a tast needs but a very small proportion of Salt to impart it; It may be reply'd, that for ought appears, common Salt and divers other bodies, though they be distill'd never so dry, and in never so close Vessels, will yeeld each of them pretty store of a Liquor, wherein though (as I lately noted) Saline Corpuscles abound, Yet there is besides a large proportion of Phlegme, as may easily be discovered by coagulating the Saline Corpuscles with any convenient Body; as I lately told you, our Friend coagulated part of the Spirit of Salt with Spirit of Urine: and as I have divers times separated a salt from Oyle of Vitriol it self (though a very ponderous Liquor and drawn from a saline body) by boyling it with a just quantity of Mercury, and then washing the newly coagulated salt from the Precipitate with fair Water. Now to what can we more
probably

probably ascribe this plenty of aqueous Substance afforded us by the Distillation of such bodies, than unto this, That among the various operations of the Fire upon the matter of a Concrete divers particles of that matter are reduc'd to such a shape and bigness, as is requisite to compose such a Liquor as Chymists are wont to call Phlegme or Water. How I conjecture this change may be effected, 'tis neither necessary for me to tell you, nor possible to do so without a much longer discourse than were now seasonable. But I desire you would with me reflect upon what I formerly told you concerning the change of Quicksilver into Water; For that water having but a very faint tast, if any whit more than divers of those liquors that Chymists referr to Phlegme, By that experiment it seems evident, that even a metalline body, and therefore much more such as are but Vegetable or Animal, may by a simple operation of the Fire be turn'd in great part into Water. And since those I dispute with are not yet able out of Gold, or Silver, or divers other Concretes to separate any thing like Water; I hope I may be allow'd to conclude against Them,

Them, that water it self is not an Universal and pre-existent Ingredient of Mixt Bodies.

But as for those Chymists that, Supposing with me the Truth of what *Helmont* relates of the *Alkabeſt*'s wonderful Effects, have a right to preſs me with his Authority concerning them, and to alledge that he could Transmute all reputed mixt Bodies into inſipid and meer Water; To thoſe I ſhall repreſent, That though his affirmations conclude ſtrongly againſt the Vulgar Chymiſts (againſt whom I have not therefore ſcrupl'd to Employ Them) ſince they Evince that the Commonly reputed Principles or ingredients of Things are not Permanent and indeſtructible; ſince they may be further reduc'd into Inſipid Phlegme differing frō them all; Yet till we can be allow'd to examine this Liquor, I think it not unreaſonable to doubt whether it be not ſomething elſe than meer Water. For I find not any other reaſon given by *Helmont* of his Pronouncing it ſo, than that it is inſipid. Now Sapour being an Accident or an Affection of matter that relates to our Tongue, Palate, and other Organs of Taſt, it may very poſſibly be,
that

that the small Parts of a Body may be of such a Size and Shape, as either by their extream littleness, or by their slenderness, or by their Figure, to be unable to pierce into and make perceptible Impression upon the Nerves or Membranous parts of the Organs of Taste, and yet may be fit to work otherwise upon divers other Bodies than meer Water can, and consequently to Disclose it self to be of a Nature farr enough from Elementary. In Silke dyed Red or of any other Colour, whilst many Contiguous Threads make up a skein, the Colour of the Silke is conspicuous; but if only a very few of them be look't upon, the Colour will appear much fainter than before. But if You take out one simple Thread, you shall not easily be able to discern any Colour at all; So subtile an Object having not the Force to make upon the Oprick Nerve an Impression great enough to be taken Notice of. It is also observ'd, that the best sort of Oyl-Olive is almost tasteless, and yet I need not tell you how exceedingly distant in Nature Oyle is from Water. The Liquor into which I told you, upon the Relation of *Lully*
an

an Eye-witness, that Mercury might be Transmuted, has sometimes but a very Languid, if any Taste; and yet its Operations even upon some Mineral Bodies are very peculiar. Quicksilver it self also, though the Corpuscles it consists of be so very small, as to get into the Pores of that Closest and compactest of Bodies, Gold, is yet (you know) altogether Tasteless. And our *Helmout* several times tells us, that fair Water, wherein a little Quantity of Quicksilver has lain for some time, though it acquire no certain Taste or other sensible Quality from the Quicksilver; Yet it has a power to destroy wormes in human Bodies; which he does much, but not causelessly extoll. And I remember, a great Lady, that had been Eminent for her Beauty in Divers Courts, confess'd to me, that this insipid Liquor was of all innocent washes for the Face the best that she ever met with.

And here let me conclude my Discourse, concerning such waters or Liquors as I have hitherto been examining, with these two Considerations. Whereof the first is, That by reason of our being wont to drink nothing but
Wine,

Wine, Bear, Cider, or other strongly tasted Liquors, there may be in several of those Liquors, that are wont to pass for insipid Phlegme, very peculiar and Distinct Tasts, though unheeded (and perhaps not to be perceiv'd) by Us. For to omit what Naturalists affirm of Apes, (and which probably may be true of divers other Animals) that they have a more exquisite palate than Men: among Men themselves, those that are wont to drink nothing but water, may (as I have try'd in my self) Discern very sensibly a great Difference of Tasts in several waters, which one unaccustomed to drink water would take to be all alike insipid. And this is the *first* of my two Considerations. The Other is, That it is not impossible that the Corpuscles, into which a body is dissipated by the Fire, may by the Operation of the same fire have their figures so altered, or may be by associations with one another brought into little Masses of such a Size and Shape, as not to be fit to make sensible Impressions on the Tongue. And that you may not think such alterations impossible, be pleased to consider with me; that not only

only the sharpest Spirit of Vinegar having dissolved as much Corall as it can, will Coagulate with it into a Substance, which, though soluble in water like salt, is incomparably less strongly Tasted than the Vinegar was before; but (what is more considerable) though the Acid salts that are carried up with Quicksilver in the preparation of common sublimate are so sharp, that being moistened with water it will Corrode some of the Metals themselves; yet this Corrosive Sublimate being twice or thrice re-sublim'd with a full proportion of insipid Quicksilver, Constitutes (as you know) that Factitious Concrete which the Chymists call *Mercurius dulcis*; not because it is sweet, but because the sharpness of the Corrosive Salts is so taken away by their Combination with the Mercurial Corpuscles, that the whole mixture when it is prepar'd is judg'd to be insipid.

And thus (continues *Carneades*) having given you some Reasons why I refuse to admit Elementary water for a constant Ingredient of Mixt Bodies, it will be easie for me to give you an Account why I also reject Earth.

For

For first, it may well be suspected that many Substances pass among Chymists under the name of Earth, because, like it, they are Dry, and Heavy, and Fixt, which yet are very farr from an Elementary Nature. This you will not think improbable, If you recall to mind what I formerly told you concerning what Chymists call the Dead Earth of things, and especially touching the copper to be drawn from the *Caput Mortuum* of Vitriol; And if also you allow me to subjoyne a casual but memorable Experiment made by *Johannes Agricola* upon the *Terra Damnata* of Brimstone. Our Author then tells us (in his notes upon *Popius*) that in the year 1621 he made an Oyle of Sulphur; the remaining *Fæces* he reverberated in a moderate Fire fourteen dayes; afterwards he put them well luted up in a Wind Oven, and gave them a strong Fire for six hours, purposing to calcine the *Fæces* to a perfect Whiteness, that he might make something else out of them. But coming to break the pot, he found above but very little *Fæces*, and those Grey and not White; but beneath there lay a fine Red *Regulus* which

which he first marvell'd at and knew not what to make of, being well assured that not the least thing, besides the *Fæces* of the Sulphur, came into the pot; and that the Sulphur it self had only been dissolv'd in Linseed Oyle; this *Regulus* he found heavy and malleable almost as Lead; having caus'd a Goldsmith to draw him a Wire of it, he found it to be of the Fairest copper, and so rightly colour'd, that a Jew of *Prague* offer'd him a great price for it. And of this Metal he saies he had 12 *loth* (or six ounces) out of one pound of Ashes or *Fæces*. And this story may well incline us to suspect that since the *Caput Mortuum* of the Sulphur was kept so long in the fire before it was found to be any thing else than a *Terra damnata*; there may be divers other Residences of Bodies which are wont to pass only for the Terrestrial *Fæces* of things, and therefore to be thrown away as soon as the Distillation or Calcination of the Body that yeelded them is ended; which yet, if they were long and Skilfully examin'd by the fire, would appear to be differing from Elementary Earth. And I have taken notice of the
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unwarrantable forwardness of common Chymists to pronounce things useless *Fæces*, by observing how often they reject the *Caput Mortuum* of Verdegrease; + which is yet so farr from deserving that Name, that not only by strong fires and convenient Additaments it may in some hours be reduc'd into copper, but with a certain Flux Powder I sometimes make for Recreation, I have in two or three minutes obtain'd that Metal from it. To which I may add, that having for tryall sake kept Venetian Talck in no less a heat than that of a glass Furnace, I found after all the Brunt of the fire it had indur'd, the remaining Body, though brittle and discolour'd, had not lost very much of its former Bulke, and seem'd still to be nearer of kin to Talck than to meer Earth. And I remember too, that a candid Mineralist, famous for his skill in trying of Oars, requesting me one day to procure him a certain *American* Mineral Earth of a *Virtuoso*, who he thought would not refuse me; I enquir'd of him why he seem'd so greedy of it: he confes'd to me that this Gentleman having brought that Earth to the publick Say-Masters;

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and

and they upon their being unable by any means to bring it to fusion or make it fly away, he (the Relator) had procur'd a little of it ; and having try'd it with a peculiar Flux, separated from it neer a third part of pure Gold ; so great mistakes may be committed in hastily concluding things to be Useless Earth.

Next, it may be suppos'd, That as in the Resolution of Bodies by the Fire some of the dissipated Parts may, by their various occursion occasion'd by the heat, be brought to stick together so closely as to constitute Corpuscles too heavy for the Fire to carry away ; the aggregate of which Corpuscles is wont to be call'd Ashes or Earth ; So other Agents may resolve the Concrete into Minute Parts after so differing a manner, as not to produce any *Caput Mortuum*, or dry and heavy Body. As you may remember *Helmont* above inform'd us, that with his great Dissolvent he divided a Coal into two liquid and volatile Bodies, æquipo-ponderant to the Coal, without any dry or fixt Residence at all.

And inded, I see not why it should be necessary that all Agents that resolve Bodies

Bodies into portions of differing qualified matter must work on them the same way, and divide them into just such parts, both for nature and Number, as the Fire dissipates them into. For since, (as I noted before) the Bulk and shape of the small Parts of bodies, together with their Fitness and unfitness to be easily put into Motion, may make the liquors or other substances such Corpuscles compose, as much to differ from each other as do some of the Chymical principles: Why may not something happen in this case, not unlike what is usuall in the grosser divisions of bodies by Mechanical Instruments? Where we see that some Tools reduce Wood, for Instance, into parts of several shapes, bigness, and other qualities, as Hatchets and Wedges divide it into grosser parts; some more long and slender, as splinters; and some more thick and irregular, as chips; but all of considerable bulk; but Files and Saws make a Commination of it into Dust; which, as all the others, is of the more solid sort of parts; whereas others divide it into long and broad, but thin and flexible parts, as do *Planes*: And of this kind of parts it self there is also a

variety according to the Difference of the Tools employ'd to work on the Wood; the shavings made by the *plane* being in some things differing from those shives or thin and flexible pieces of wood that are obtain'd by *Borers*, and these from some others obtainable by other Tools. Some Chymical Examples applicable to this purpose I have elsewhere given you. To which I may add, that whereas, in a mixture of Sulphur & Salt of Tartar well melted and incorporated together, the action of pure spirit of Wine digested on it is to separate the sulphureous from the Alcalizate Parts, by dissolving the former and leaving the latter: the action of Wine (probably upon the score of its copious Phlegme) upon the same mixture is to divide it into Corpuscles consisting of both Alcalizate and Sulphureous Parts united. And if it be objected, that this is but a Factitious Concrete; I answer, that however the instance may serve to illustrate what I propos'd, if not to prove it; and that Nature her self doth in the bowels of the Earth make Decomposed Bodies, as we see in Vitriol, Cinnaber, and even in Sulphur it self; I will not urge that
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the Fire divides new Milk into five differing Substances; but Runnet and Acid Liquors divide it into a Coagulated matter and a thin Whey : And on the other side churning divides it into Butter and Butter-milk, which may either of them yet be reduc'd to other substances differing from the former. I will not press this, I say, nor other instances of this Nature, because I cannot in few words answer what may be objected, that these Concretes sequestred without the help of the Fire may by it be further divided into Hypostatical Principles. But I will rather represent, That whereas the same spirit of Wine will dissociate the Parts of Camphire, and make them one Liquor with it self; *Aqua Fortis* will also disjoyn them, and put them into motion; but so as to keep them together, and yet alter their Texture into the form of an Oyle. I know also an uncompounded Liquor, that an extraordinary Chymist would not allow to be so much as Saline, which doth (as I have try'd) from Coral it self (as fixt as divers judicious writers assert that Concrete to be) not only obtain a noble Tincture without the Intervention of Nitre or o-

ther Salts; but will carry over the Tincture in Distillation. And if some reasons did not forbid me, I could now tell you of a *Menstruum* I make my self, that doth more odly dissociate the parts of Minerals very fixt in the fire. So that it seems not incredible, that there may be some Agent or way of Operation found, whereby this or that Concrete, if not all Firme Bodies, may be resolv'd into parts so very minute and so apt to stick close to one another, that none of them may be fixt enough to stay behind in a strong Fire, and to be incapable of Distillation; nor consequently to be look'd upon as Earth. But to return to *Helmont*; the same Author somewhere supply's me with another Argument against the Earth's being such an Element as my Adversaries would have it. For he somewhere affirms, that he can reduce all the Terrestrial parts of mixt bodies into insipid water; whence we may argue against the Earths being one of their Elements, even from that Notion of Elements, which you may remember *Philoponus* recited out of *Aristotle* himself, when he lately disputed for his Chymists against *Themistius*. And here we may

on this occasion consider, that since a Body, from which the Fire hath driven away its looser parts, is wont to be look'd upon as Earth, upon the Account of its being endow'd with both these qualities, Tastefnesse and Fixtnesse, (for Salt of Tartar, though Fixt, passes not among the Chymists for Earth, because 'tis strongly Tasted) if it be in the power of Natural Agents to deprive the *Caput Mortuum* of a body of either of those two Qualities, or to give them both to a portion of matter that had them not both before, the Chymists will not easily define what part of a resolv'd Concrete is Earth, and make out, that that Earth is a primary, simple, and indestructible Body. Now there are some cases wherein the more skilful of the Vulgar Chymists themselves pretend to be able, by repeated Cohobations and other fit Operations, to make the Distilled parts of a Concrete bring its own *Caput Mortuum* over the Helme, in the forme of a Liquor, in which state being both Fluid and Volatile, you will easily beleeve it would not be taken for Earth. And indeed by a skilful, but not Vulgar, way of managing some Concretes, there may be more ef-

fect'd in this kind, than you perhaps would easily think. And on the other side, that either Earth may be Generated, or at least Bodies that did not before appear to be neer Totally Earth, may be so alter'd as to pass for it, seems

Novi item modos quibus totum Sal-petra in terram convertitur, totumque Sulphur semel dissolutum fixetur in Pulverem terreum. Helmont in Compl. atque Mist. Elementor. Sect. 24.

very possible, if *Helmont* have done that by Art which he mentions in several places; especially where he saies that he knowes waies whereby Sulphur once

dissolv'd is all of it fix'd into a Terrestrial Powder, and the whole Body of Salt-Petre may be turn'd into Earth: Which last he elsewhere saies is Done by the Odour only of a certain Sulphureous Fire. And in another place He mentions one way of doing this, which I cannot give you an Account of; because the Materials I had prepar'd for Trying it, were by a Servants mistake unhappily thrown away.

And these Last Arguments may be confirm'd by the Experiment I have often had occasion to mention concerning the Mint I produc'd out of Water. And partly by an Observation of *Rondeletius*

deletius concerning the Growth of Animals also, Nourish'd but by Water, which I remember'd not to mention, when I discours'd to you about the Production of things out of Water. This Diligent Writer then in his instructive book of fishes, affirms That his Wife kept a fish in a Glafs of water without any other Food for three years; in which space it was constantly augmented, till at last it could not come out of the Place at which it was put in, and at length was too big for the glafs it self, though that were of a large capacity. And because there is no just reason to doubt, that this Fish, if Distill'd would have yeelded the like differing substances with other Animals; And However, because the Mint, which I had out of water, afforded me upon Distillation a good quantity of Charcoal; I think I may from thence inferr, that Earth it self may be produc'd out of Water; or if you please, that water may be transmuted into Earth; and consequently, that though it could be prov'd, that Earth is an Ingredient actually in-existent in the Vegetable and Animal Bodies whence it may be obtain'd by Fire: yet it would
not

Lib. 1.
cap. 2.

not necessarily follow, that Earth, as a pre-existent Element does with other Principles convene to make up those Bodies whence it seems to have been separated.

After all is said (saies *Eleutherius*) I have yet something to Object, that I cannot but think considerable, since *Carneades* himself alledg'd it as such; for, (continues *Eleutherius* smiling) I must make bold to try whether you can as luckily answer your own Arguments, as those of your Antagonists, I mean (pursues he) that part of your Concessions, wherein you cannot but remember, that you supply'd your Adversaries with an Example to prove that there may be Elementary Bodies, by taking Notice that Gold may be an Ingredient in a multitude of differing Mixtures, and yet retain its Nature, notwithstanding all that the Chymists by their Fires and Corrosive Waters are able to do to Destroy it.

I sufficiently intimated to you at that time (replies *Carneades*) that I propos'd this Example, chiefly to shew you how Nature may be Conceiv'd to have made Elements, not to prove that she actually

actually has made any; And you know, that *a posse ad esse* the Inference will not hold. But (continues *Carneades*) to answer more directly to the Objection drawn from Gold, I must tell You, that though I know very well that divers of the more sober Chymists have complain'd of the Vulgar Chymists, as of Mountebanks or Cheats, for pretending so vainly, as hitherto they have done, to Destroy Gold; Yet I know a certain *Menstruum* (which our Friend has made, and intends shortly to communicate to the Ingenious) of so piercing and powerful a Quality, That if notwithstanding much care, and some skill, I did not much deceive my self, I have with it really destroy'd even refin'd Gold, and brought it into a Metalline Body of another colour and Nature, as I found by Tryals purposely made. And if some just Considerations did not for the present Forbid it, I could Perchance here shew you by another Experiment or Two of my own Trying, that such *Mens-truums* may be made as to entice away and retain divers parts from Bodies, which even the more Judicious and Experienc'd *Spagyrist*s have pronounc'd

nounc'd irresoluble by the Fire. Though (which I Desire you would mark) in neither of these Instances, the Gold or Precious Stones be Analyz'd into any of the *Tria Prima*, but only Reduc'd to new Concretes. And indeed there is a great Disparity betwixt the Operations of the several Agents whereby the Parts of a Body come to be Dissipated. As if (for Instance) you dissolve the purer sort of Vitriol in common Water, the Liquor will swallow up the Mineral, and so Dissociate its Corpuscles, that they will seem to make up but one Liquor with those of the water; and yet each of these Corpuscles retains its Nature and Texture, and remains a Vitriolate and Compounded Body. But if the same Vitriol be exposed to a strong Fire, it will then be divided not only, as before, into smaller parts, but into Heterogeneous Substances, each of the Vitriolate Corpuscles that remain'd entire in the water, being it self upon the Destruction of its former Texture Dissipated or divided into new Particles of differing Qualities. But Instances more fitly applicable to this purpose I have already given you. Wherefore to re-
turn

turn to what I told you about the Destruction of Gold; that Experiment Invites me to Represent to you, that Though there were either Saline; or Sulphureous, or Terrestrial Portions of Matter, whose parts were so small, so firmly united together, or of a figure so fit to make them cohere to one another, (as we see that in quicksilver broken into little Globes, the Parts brought to touch one another do immediately re-imbody) that neither the Fire, nor the usual Agents, employ'd by Chymists, are piercing enough to divide their Parts, so as to destroy the Texture of the single Corpuscles; yet it would not necessarily follow, That such Permanent Bodies were Elementary; since 'tis possible there may be Agents found in Nature, some of whose parts may be of such a Size and Figure as to take better Hold of some parts of these seemingly Elementary Corpuscles than these parts do of the rest, and Consequently may carry away such parts with them, and so dissolve the Texture of the Corpuscle by pulling its parts asunder. And if it be said, that at least we may this way discover the Elementary Ingredients of things

things, by observing into what Substances these Corpuscles, that were reputed pure are divided; I answer, that 'tis not necessary that such a Discovery should be practicable. For if the Particles of the Dissolvent do take such firm hold of those of the Dissolved Body, they must constitute together new Bodies, as well as Destroy the Old; and the strickt Union, which according to this *Hypothesis* may well be suppos'd betwixt the Parts of the Emergent Body, will make it as Little to be Expected that they should be pull'd asunder, but by little Parts of matter, that to Divide them Associate Themselves and stick extreemly close to those of them which they sever from their Former Adherents. Besides that it is not impossible, that a Corpuscle suppos'd to be Elementary may have its Nature changed, without suffering a Divorce of its parts, barely by a new Texture Effected by some powerful Agent; as I formerly told you, the same portion of matter may easily by the Operation of the Fire be turn'd at pleasure into the form of a Brittle and Transparent, or an Opacous and Malleable Body.

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And indeed, if you consider how farr the bare Change of Texture, whether made by Art or Nature (or rather by Nature with or without the assistance of man) can go in producing such New Qualities in the same parcel of matter, and how many inanimate Bodies (such as are all the Chymical productions of the Fire) we know are Denominated and Distinguish'd not so much by any Imaginary Substantial Form, as by the aggregate of these Qualities; If you consider these Things, I say, and that the varying of either figure, or the Size, or the Motion, or the Situation, or Connexion of the Corpuscles whereof any of these Bodies is compos'd, may alter the Fabrick of it, you will possibly be invited to suspect with me, that there is no great need that Nature should alwaies have Elements before hand, whereof to make such Bodies as we call mixts. And that it is not so easie as Chymists and others have hitherto Imagin'd, to discern, among the many differing Substances that may without any extraordinary skill be obtain'd from the same portion of matter, Which ought to be esteemed exclusively to all the rest,

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its in-existent Elementary Ingredients, much less to determine what Primogeneal and Simple Bodies convened together to compose it. To exemplify this, I shall add to what I have already on several occasions Represented, but this single instance.

You may remember (*Eleutherius*) that I formerly intimated to you, that besides Mint and Pompions, I produced divers other Vegetables of very differing Natures out of Water. Wherefore you will not, I presume, think it incongruous to suppose, that when a slender Vine-clip is set into the ground, and takes root there, it may likewise receive its Nutriment from the water attracted out of the earth by its roots, or impell'd by the warm'th of the Sun, or pressure of the ambient air into the pores of them. And this you will the more easily beleieve, if you ever observ'd what a strange quantity of Water will Drop out of a wound given to the Vine, in a convenient place, at a seasonable time in the Spring; and how little of Taste or Smell this *Aqua Vitæ*, as Physicians call it, is endow'd with, notwithstanding what concoction or alteration it may receive in its passage through

through the Vine, to discriminate it from common Water. Supposing then this Liquor, at its first entrance into the roots of the Vine, to be common Water; Let us a little consider how many various Substances may be obtain'd from it; though to do so, I must repeat somewhat that I had a former occasion to touch upon. And first, this Liquor being Digested in the plant, and assimilated by the several parts of it, is turn'd into the Wood, Bark, Pith, Leaves, &c. of the Vine; The same Liquor may be further dry'd, and fashion'd into Vine-buds, and these a while after are advanced unto sowre Grapes, which express'd yeeld Verjuice, a Liquor very differing in several qualities both from Wine and other Liquors obtainable from the Vine: These sowre Grapes, being by the heat of the Sun concocted and ripened, turne to well tasted Grapes; These, if dry'd in the Sun and Distill'd, afford a fætid Oyle and a piercing *Empyreumatical* Spirit, but not a Vinous Spirit; These dry'd Grapes or Raisins, boyl'd in a convenient proportion of Water, make a sweet Liquor, which, being betimes distill'd, afford an Oyle & Spirit much like

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those of the Raisins themselves; If the juice of the Grapes be squeez'd out and put to Ferment, it first becomes a sweet and turbid Liquor, then grows lesse sweet and more clear, and then affords in common Distillations not an Oyle but a Spirit, which, though inflamable like Oyle, differs much from it, in that it is not fat, and that it will readily mingle with Water. I have likewise without Addition obtain'd in procelle of time (and by an easie way which I am ready to teach you) from one of the noblest sorts of Wine, pretty store of pure and curiously figured Chrystals of Salt, together with a great proportion of a Liquor as sweet almost as Honny; and these I obtained not from Must, but True and sprightly Wine; besides the Vinous Liquor, the fermented Juice of Grapes is partly turned into liquid Dregs or Leeze, and partly into that crust or dry feculancy that is commonly called Tartar; and this Tarrar may by the Fire be easily divided into five differing substances; four of which are not Acid, and the other not so manifestly Acid as the Tartar it self; The same Vinous Juice after some time, especially if it be not carefully kept

kept, Degenerates into that very fowre Liquor called Vinegar; from which you may obtain by the Fire a Spirit and a Chrystalline Salt differing enough from the Spirit and Lixivate Salt of Tartar. And if you poure the Dephlegm'd Spirit of the Vinegar upon the Salt of Tartar, there will be produc'd such a Conflict or Ebullition, as if there were scarce two more contrary Bodies in Nature; and oftentimes in this Vinegar you may observe part of the matter to be turned into an innumerable company of swimming Animals, which our Friend having divers years ago observed, hath in one of his Papers taught us how to discover clearly without the help of a *Microscope*.

Into all these various Schemes of matter, or differinglly Qualified Bodies, besides divers others that I purposely forbear to mention, may the Water, that is imbib'd by the roots of the Vine, be brought, partly by the formative power of the plant, and partly by supervenient Agents or Causes, without the visible concurrence of any extraneous Ingredient; but if we be allow'd to add to the Productions of this transmuted Water a few other substances, we may much

encrease the Variety of such Bodies; although in this second sort of Productions, the Vinous parts seem scarce to retain any thing of the much more fix'd Bodies wherewith they were mingl'd, but only to have by their Mixture with them acquir'd such a Disposition, that in their recess occasion'd by the Fire they came to be alter'd as to shape, or Bigness, or both, and associated after a New manner. Thus, as I formerly told you, I did by the Addition of a *Caput Mortuum* of Antimony, and some other Bodies unfit for Distillation, obtain from crude Tartar, store of a very Volatile and Chrystalline Salt, differing very much in smell and other Qualities from the usuall salts of Tartar.

But (saies *Eleutherius*, interrupting him at these Words) if you have no restraint upon you, I would very gladly before you go any further, be more particularly inform'd, how you make this Volatile Salt, because (you know) that such Multitudes of Chymists have by a scarce imaginable variety of waies, attempted in Vain the Volatilization of the Salt of Tartar, that divers learned *Spagyrist*s speak as if it were impossible

to make any thing out of Tartar, that shall be Volatile in a Saline Forme, or, as some of them express it, *in forma sicca*. I am very farr from thinking (answers *Carneades*) that the Salt I have mention'd is that which *Paracelsus* and *Helmont* mean, when they speak of *Sal Tartari Volatile*, and ascribe such great things to it. For the Salt I speak of falls extreamly short of those Vertues, not seeming in its Tast, Smel, and other Obvious Qualities, to differ very much (though something it does differ) from Salt of Harts-horn, and other Volatile Salts drawn from the Distill'd Parts of Animals. Nor have I yet made Tryals enough to be sure, that it is a pure Salt of Tartar without participating any thing at all of the Nitre, or Antimony. But because it seems more likely to proceed from the Tartar, than from any of the other Ingredients, and because the Experiment is in it self not Ignoble, and Luciferous enough (as shewing a new way to produce a Volatile Salt, contrary to Acid Salts, from Bodies that otherwise are Observ'd to yeeld no such Liquor, but either only, or chiefly, Acid ones,) I

shall, to satisfie you, acquaint you before any of my other Friends with the way I now use (for I have formerly us'd some others) to make it.

+ Take then of good Antimony, Salt-Petre and Tartar, of each an equal Weight, and of Quicklime Halfe the Weight of any one of them; let these be powder'd and well mingl'd; this done, you must have in readines a long neck or Retort of Earth, which must be plac'd in a Furnace for a naked Fire, and have at the top of it a hole of a convenient Bigness, at which you may cast in the Mixture, and presently stop it up again; this Vessel being fitted with a large Receiver must have Fire made under it, till the bottom of the sides be red hot, and then you must cast in the above prepar'd Mixture, by aboute halfe a spoonful (more or less) at a time, at the hole made for that purpose; which being nimblely stoppt, the Fumes will pass into the Receiver and condense there into a Liquor, that being rectifi'd will be of a pure Golden Colour, and carry up that colour to a great height; this Spirit abounds in the Salt I told you of, part of which may easily enough be separated by

by the way I use in such cases, which is, to put the Liquor into a glass Egg, or bolthead with a long and narrow Neck. For if this be plac'd a little inclining in hot sand, there will sublime up a fine Salt, which, as I told you, I find to be much of kin to the Volatile Salts of Animals: For like them it has a Saltish, not an Acid Salt; it hisses upon the Affusion of Spirit of Nitre, or Oyle of Vitriol; it precipitates Corals Dissolv'd in Spirit of Vinegar; it turnes the blew Syrup of Violets immediately green; it presently turnes the Solution of Sublimate into a Milkie whiteness; and in summ, has divers Operations like those that I have observ'd in that sort of Salts to which I have resembled it: and is so Volatile, that for Distinction sake, I call it *Sal Tartari Fugitivus*. What vertues it may have in Physick I have not yet had the opportunity to try; but I am apt to think they will not be despicable. And besides that, a very Ingenious Friend of mine tells me he hath done great matters against the stone with a Preparation not very much Differing from ours: a very Experienc'd Germane Chymist finding that I was

unacquainted with the waies of making this salt, told me that in a great City in his Country, a noted Chymist prizes it so highly, that he had a while since procur'd a Priviledge from the Magistrates, that none but He, or by his Licence, should vent a Spirit made almost after the same Way with mine, save that he leaves out one of the Ingredients, namely the Quick-lime. But, (continues *Carneades*) to resume my Former Discourse where your Curiosity interrupted it;

Tis also a common practice in *France* to bury thin Plates of Copper in the Marc (as the French call it) or Husks of Grapes, whence the Juice has been squeez'd out in the Wine-press; and by this means the more saline parts of those Husks, working by little and little upon the Copper, Coagulate Themselves with it into that Blewish Green Substance we in English call Verdigrease. Of which I therefore take Notice, because having Distill'd it in a Naked Fire, I found, as I expected, that by the Association of the Saline with the Metalline parts, the former were so alter'd, that the Distill'd Liquor, even without Rectification, seem'd by smell
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and Taſt, ſtrong almoſt like *Aqua Fortis*, and very much ſurpaſſed the pureſt and moſt Redifi'd Spirit of Vinegar that ever I made. And this Spirit I therefore aſcribe to the ſalt of the Huſks alter'd by their Co-Mixture with the Copper (though the Fire afterwards Divorce and Tranſmute them) becauſe I found this latter in the bottom of the Retort in the Forme of a *Crocus* or rediſh powder: And becauſe Copper is of too ſluggiſh a Nature to be forc'd over in cloſe Veſſels by no ſtronger a heat. And that which is alſo ſome- what Remarkable in the Diſtillation of good Verdigrease, (or at leaſt of that ſort that I us'd) is this, that I Never could obſerve that it yeelded me any oyl, (unleſs a little black ſlime which was ſeparated in Redification may paſs for Oyle) though both Tartar and Vinegar, (eſpecially the former) will by Diſtillation yeeld a Moderate proportion of it. If likewiſe you poure Spirit of Vinegar upon Calcin'd Lead, the Acid Salt of the Liquor will by its Commixture with the Metalline parts, though inſipid; acquire in few hours a more than Saccharine ſweetneſs; and theſe Saline parts

parts being by a strong Fire Distill'd from the Lead wherewith they were imbody'd, will, as I formerly also noted to a Different purpose, leave the Metal behind them alter'd in some qualities from what it was, and will themselves ascend, partly in the Form of an unctuous Body or Oyle, partly in that of Phlegme, but for the greatest part in the Forme of a subtile Spirit, indow'd, besides divers new Qualities which I am not now willing to take notice of, with a strong smell very much other than that of Vinegar, and a piercing tast quite differing both from the Sourness of the Spirit of Vinegar, and the Sweetness of the Sugar of Lead.

To be short, as the difference of Bodies may depend meerly upon that of the schemes whereinto their Common matter is put; So the seeds of Things, the Fire and the other Agents are able to alter the minute parts of a Body (either by breaking them into smaller ones of differing shapes, or by Uniting together these Fragments with the unbroken Corpuscles, or such Corpuscles among Themselves) and the same Agents partly by Altering the shape or bigness

bigness of the Constituent Corpuscles of a Body, partly by driving away some of them, partly by blending others with them, and partly by some new manner of connecting them, may give the whole portion of matter a new Texture of its minute parts, and thereby make it deserve a new and Distinct name. So that according as the small parts of matter recede from each other, or work upon each other, or are connected together after this or that determinate manner, a Body of this or that denomination is produced, as some other Body happens thereby to be alter'd or destroy'd.

Since then those things which Chymists produce by the help of the Fire are but inanimate Bodies; since such fruits of the Chymists skill differ from one another but in so few qualities that we see plainly that by fire, and other Agents we can employ, we can easily enough work as great alterations upon matter, as those that are requisite to change one of these Chymical Productions into another; Since the same portion of matter may without being Compounded with any extraneous Body, or at least Element, be made to put on such a variety

riety of formes, and consequently to be (successively) turn'd into so many differing Bodies; And since the matter, cloath'd with so many differing formes, was originally but water, and that in its passage through so many transformations, it was never reduc'd into any of those substances which are reputed to be the Principles or Elements of mixt Bodies, except the violence of the fire, which it self divides not Bodies into perfectly simple or Elementary substances, but into new Compounds; Since, I say, these things are so, I see not why we must needs beleieve that there are any Primogenial & simple Bodies, of which, as of Pre-existent Elements, Nature is obliged to compound all others. Nor do I see why we may not conceive that she may produce the Bodies accounted mixt out of one another by Variously altering and contriving their minute parts, without resolving the matter into any such simple or Homogeneous substances as are pretended. Neither, to dispatch, do I see why it should be counted absurd to think, that when a Body is resolv'd by the Fire into its suppos'd simple Ingredients, those substances are not true and proper

proper Elements, but rather were, as it were, Accidentally produc'd by the fire, which by Dissipating a Body into minute Parts does, if those parts be shut up in Close Vessels, for the most part necessarily bring them to Associate Themselves after another manner than before, and so bring Them into Bodies of such Different Consistences, as the Former Texture of the Body and Concurrent Circumstances make such disbanded particles apt to Constitute; as experience shews us (and I have both noted it, and prov'd it already) that as there are some Concretes whose parts, when dissipated by fire, are fitted to be put into such Schemes of matter as we call Oyle, and Salt, and Spirit; So there are others, such as are especially the greatest part of Minerals, whose Corpuscles being of another Size or figure, or perhaps contriv'd another Way, will not in the Fire yeeld Bodies of the like Consistences, but rather others of differing Textures; Not to mention, that from Gold and some other Bodies, we see not that the Fire separates any Distinct Substances at all; nor that even those Similar Parts of
Bodies

Bodies, which the Chymists Obtain by the Fire, are the Elements whose names they bear, but Compound Bodies, upon which, for their resemblance to them in consistence, or some other obvious Quality, Chymists have been pleas'd to bestow such Appellations.

THE



THE CONCLUSION.

THese last Words of *Carneades* being soon after follow'd by a noise which seem'd to come from the place where the rest of the Company was, he took it for a warning, that it was time for him to conclude or break off his Discourse; and told his Friend; By this time I hope you see, *Eleutherius*, that if *Helmonts* Experiments be true, it is no absurdity to question whether that Doctrine be one, that doth not Assert Any Elements in the sence before explain'd. But because that, as divers of my Arguments suppose the marvellous power of the *Alkabeſt* in the Analyzing of Bodies, so the Effects ascrib'd to that power are so unparallell'd and stupendous,

dous, that though I am not sure but that there may be such an Agent, yet little less than *αὐτοψία* seems requisite to make a man sure there is. And consequently I leave it to you to judge, how farr those of my Arguments that are built upon *Alkabeistical* Operations are weakned by that Liquors being Matchless; and shall therefore desire you not to think that I propose this Paradox that rejects all Elements, as an Opinion equally probable with the former part of my discourse. For by that, I hope, you are satisfied, that the Arguments, wont to be brought by Chymists to prove That all Bodies consist of either Three Principles, or Five, are far from being so strong as those that I have employ'd to prove; that there is not any certain and Determinate number of such Principles or Elements to be met with Universally in all mixt Bodies. And I suppose I need not tell you, that these *Anti-Chymical* Paradoxes might have been manag'd more to their Advantage; but that having not confin'd my Curiosity to Chymical Experiments; I, who am but a young Man, and younger Chymist, can yet be but slenderly furnished with them,

them, in reference to so great and difficult a Task as you impos'd upon me; Besides that, to tell you the Truth, I durst not employ some even of the best Experiments I am acquainted with, because I must not yet disclose them; but however, I think I may presume that what I have hitherto Discourfed will induce you to think, that Chymists have been much more happy in finding Experiments than the Causes of them; or in assigning the Principles by which they may best be explain'd. And indeed, when in the writing of *Paracelsus* I meet with such Phantastick and Un-intelligible Discourses as that Writer often puzzles & tires his Reader wth, father'd upon such excellent Experiments, as though he seldom clearly teaches, I often find he knew; methinks the Chymists, in their searches after truth, are not unlike the Navigators of *Solomons Tarshish* Fleet, who brought home from their long and tedious Voyages, not only Gold, and Silver, and Ivory, but Apes and Peacocks too; For so the Writings of several (for I say not, all) of your Hermetick Philosophers present us, together with divers Substantial and

noble Experiments, Theories, which either like Peacocks feathers make a great shew, but are neither solid nor useful; or else like Apes, if they have some appearance of being rational, are blemish'd with some absurdity or other, that when they are *Attentively* consider'd, make them appear Ridiculous.

Carneades having thus finish'd his Discourse against the received Doctrines of the *Elements*, *Eleutherius* judging he should not have time to say much to him before their separation, made some haste to tell him; I confess, *Carneades*, that you have said more in favour of your Paradoxes than I expected. For though divers of the Experiments you have mention'd are no secrets, and were not unknown to me, yet besides that you have added many of your own unto them, you have laid them together in such a way, and apply'd them to such purposes, and made such Deductions From them, as I have not Hitherto met with.

But though I be therefore inclin'd to think, that *Philoponus*, had he heard you, would scarce have been able in all
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points to defend the Chymical *Hypothesis* against the arguments wherewith you have oppos'd it; yet methinks that however your Objections seem to evince a great part of what they pretend to, yet they evince it not all; and the numerous tryals of those you call the vulgar Chymists, may be allow'd to prove something too.

Wherefore, if it be granted you that you have made it probable,

First, that the differing substances into which mixt Bodies are wont to be resolved by the Fire are not of a pure and an Elementary nature, especially for this Reason, that they yet retain so much of the nature of the Concrete that afforded them, as to appear to be yet somewhat compounded, and oftentimes to differ in one Concrete from Principles of the same denomination in another:

Next, that as to the number of these differing substances, neither is it precisely three, because in most Vegetable and Animal bodies Earth and Phlegme are also to be found among their Ingredients; nor is there any one determinate number into which the Fire (as it is

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wont

wont to be employ'd) does precisely and universally resolve all compound Bodies whatsoever, as well Minerals as others that are reputed perfectly mixt:

Lastly, that there are divers Qualities which cannot well be refer'd to any of these Substances, as if they primarily resided in it and belong'd to it; and some other qualities, which though they seem to have their chief and most ordinary residence in some one of these Principles or Elements of mixt Bodies, are not yet so deducible from it, but that also some more general Principles must be taken in to explicate them:

If, I say, the Chymists (continues *Eleutherius*) be so Liberall as to make you these three Concessions, I hope you will, on your part, be so civil and Equitable as to grant them these three other propositions, namely;

First, that divers Mineral Bodies, and therefore probably all the rest, may be resolv'd into a Saline, a Sulphureous, and a Mercurial part; And that almost all Vegetable and Animal Concretes may, if not by the Fire alone, yet by a skilfull Artist Employing the Fire as
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his chief Instrument, be divided into five differing Substances, Salt, Spirit, Oyle, Phlegme and Earth; of which the three former by reason of their being so much more Operative than the Two Latter, deserve to be Lookt upon as the Three active Principles, and by way of Eminence to be call'd the three principles of mixt bodies.

Next, that these Principles, Though they be not perfectly Devoid of all Mixture, yet may without inconvenience be stil'd the Elements of Compound-ed bodies, and bear the Names of those Substances which they most Resemble, and which are manifestly predominant in them; and that especially for this reason, that none of these Elements is Divisible by the Fire into Four or Five differing substances, like the Concrete whence it was seperated.

Lastly, That Divers of the Qualities of a mixt Body, and especially the Medical Virtues, do for the most part lodge in some One or Other of its principles, and may Therefore usefully be sought for in That Principle sever'd from the others.

And in this also (pursues *Eleutherius*)
methinks

methinks both you and the Chymists may easily agree, that the surest way is to Learn by particular Experiments, what differing parts particular Bodies do consist of, and by what wayes (either Actual or potential fire) they may best and most Conveniently be Separated, as without relying too much upon the Fire alone, for the resolving of Bodies, so without fruitlessly contending to force them into more Elements than Nature made Them up of, or strip the sever'd Principles so naked, as by making Them Exquisitely Elmentary to make them almost useless.

These things (subjoynes *Eleu.*) I propose, without despairing to see them granted by you; not only because I know that you so much prefer the Reputation of *Candour* before that of subtilty, that your having once suppos'd a truth would not hinder you from embracing it when clearly made out to you; but because, upon the present occasion, it will be no disparagement to you to recede from some of your Paradoxes, since the nature and occasion of your past Discourse did not oblige you to declare your own opinions, but only
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to personate an Antagonist of the Chymists. So that (concludes he, with a smile) you may now by granting what I propose, add the Reputation of Loving the truth sincerely to that of having been able to oppose it subtilly.

Carneades's haste forbidding him to answer this crafty piece of flattery; Till I shall (saies he) have an opportunity to acquaint you with my own Opinions about the controversies I have been discoursing of, you will not I hope, expect I should declare my own sence of the Argument I have employ'd. Wherefore I shall only tell you thus much at present; that though not only an acute Naturalist, but even I my self could take plausible Exceptions at some of them; yet divers of them too are such as will not perhaps be readily answer'd, and will Reduce my Adversaries, at least, to alter and Reform their *Hypothesis*. I perceive I need not mind you that the Objections I made against the Quaternary of Elements and Ternary of Principles needed not to be oppos'd so much against the Doctrines Themselves, either of which, especially the latter, may be much more probably

bably maintain'd than hitherto it seems to have been, by those Writers for it I have met with) as against the unaccuracy and the unconcludingness of the *Analytical* Experiments vulgarly Relyed On to Demonstrate them.

And therefore, if either of the two examin'd Opinions, or any other Theory of Elements ; shall upon rational and Experimental grounds be clearly made out to me ; 'Tis Obliging , but not irrational, in you to Expect, that I shall not be so farr in Love with my Disquieting Doubts, as not to be content to change them for undoubted truths. And (concludes *Carneades* smiling) it were no great disparagement for a Sceptick to confesse to you , that as unsatisfy'd as the past discourse may have made you think me with the Doctrines of the Peripateticks, and the Chymists , about the Elements and Principles , I can yet so little discover what to acquiesce in, that perchance the Enquiries of others have scarce been more unsatisfactory to me , than my own have been to my self.

FINIS.

Experiments AND NOTES

About the

PRODUCIBLENESS
OF

Chymicall Principles]

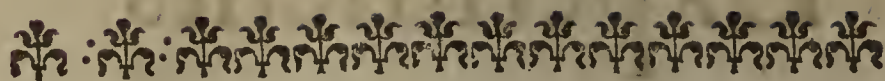
Being Parts of an Appendix, design'd
to be added to the SCEPTICAL
CHYMIST.

By the Authour of that Booke.



OXFORD;

Printed by H. Hall for Ric. Davis. 1680.



The Authors Preface.



Having long since observ'd, that a great part of the erroneous Reasonings and Conclusions of Learned Men, as well about Physicall, as other subjects, proceeds not so much from their making bad illations, as from their assuming false or uncertaine Principles, to draw their consequences from: I thought, I could scarce mispend the time I allow'd my selfe for Chymicall Studies, if I employ'd some part of it, in examining the Doctrine about the Principles of Natural Bodies. Upon this account I did, in the year 1661. venture abroad my Scepticall Chymist, to acquaint the inquisitive with my doubts, and excite them, to a more thorow disquisition of a subject, so considerable, as well to Natural Philosophy, as to Physick. This discourse being once published in English, and soone after in Latine: I thought fit

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fit to wait a while, that I might learn what Judgement would be made of it, and whether any of the Chymists would return an answer to it, and in the mean while; to gratifie those that appear'd desirous of having it soon reprinted, I gathered divers Notes, (some of them considerable for bulk) to be inserted here and there, as enlargements in the next Edition, whose volume I was not unwilling somewhat to encrease, not only because I thought Truth in general, a thing worthy that the lovers of it should take pains to discover, and establish it, but because, I look'd upon the truth enquired after, in the Scepticall Chymist, as of no mean importance; especially since the mistakes that very many have made about it, have I fear, not only been prejudicial to Natural Philosophy, but have, by severall Men, as well Learned as Ignorant, been adopted both into the speculations, and practise of Physitians; whose Art being conversant about the Health and Life of Man, Doctrinal errors in it, cannot but be dangerous, and therefore fit, as much as is possible, to be solicitously avoided, or remov'd. These inconveniencies I hop'd

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might in some measure be obviated ; if it were further made appear by Experiments as well as Reasonings, that the vulgar doctrine of the *Tria Prima* is at least very questionable, or uncertaine and very narrow. For the contrary persuasions, about these Principles, has misled divers Learned Men to give, and take up with precarious and superficial accounts of divers Phænomena of Nature, by which meanes they have been diverted from employing their Wits (wherein divers of them are happy) in the investigation of the true and fundamentall causes, the discovery whereof, would have enabled them, instead of dark and superficial, to give intelligible and particular explications of those Phænomena, and many others. The difference between the accounts given of the same Phænomena, by the Hypostatical, and by the Mechanical Principles, may be seen exemplified, by particular instances in other Papers ; Wherefore I shall proceed to observe as to Physick, that besides the mistakes which I doubt, divers Learned Men have by another valuation of the Doctrine of the *Tria prima*, been led into, in relation to the causes of divers things that occur to humane Bodies, and even in Chymical

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Chymical operations; besides this I say, I fear that the too confident opinion of the Doctrine I question has made divers practitioners of Physick, make wrong estimates of Medicines. But after I had waited a competent time, I perceiv'd no Author vouchsaf'd the Scepticall Chymist an answer; but a very Ingenious Man, from whom I chiefly expected it, told me, that he had indeed design'd to write one, but was hindered by considering, that I had so stated the case, that an answer could not confute that Book, by any meer Justification of the Chymists Principles, since he would be obliged also to defend the Chymical Doctrine as 'tis generally taught by the vulgar Chymists; and make good the Arguments by which they are wont to maintaine it. Since 'tis only that Doctrine and these Arguments, that I declare myself in that discourse to question; and he himself did not think them sound and valid. By these encouragements, I was induced to comply with the earnest solicitations of the Printer, for another Edition, but he dying soon after, and the Person to whom the right to dispose of the English Copy, legally came, having

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left England, and continued out of it, for divers Tears, the dispute between the Stationers that pretended to it, and treated about it, lasted so long, that a Traveller who passed this way told an acquaintance of mine, that he had then (which was two or three years agoe) seen nine severall Latine impressions of it, since when, another has been brought me made at Geneva. This number of Editions (in none of which I have added or altered a Word) and the numerous citations I have mett with of it, in favourable Writers, made me unwilling to confound, or trouble, Readers by interweaving Additional Notes, with the Body of the Discourse; and so by obliging those that should hereafter Vouchsafe to mention any of the inserted passages of it, to cite the Edition as well as the Book. And therefore I was easily inclin'd, by want of Health and Leasure, to peruse againe deliberately the whole Treatise, to suppress all those Notes, that I could not readily and conveniently refer to three or four of the chief heads, I intended to enlarge upon, and without altering the forme of the Book wherein it has prov'd so fortunate to leave it intire, and

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and publish my Additions also by themselves by way of Appendix. This in my Intention was to consist of four heads, The Producibleness of Chymicall Principles, The uncertainty of the vulgar Analyses made by distillation. The various effects of the fire according to the differing waies of employing it. And doubts whether there be any Elements, or material Principles of mixt Bodies, one or more in the sense vulgarly received. But finding by the Stationers estimate, that the notes refer'd to the three last Titles, are not near so large as those that belong to the first; yet they would make the book to which they should be added, and which is already printed, of too great a thickness in proportion to its other dimensions, I thought fitt to reserve the other papers for another opportunity, and at this time annex nothing, but what concerns the Producibleness of Chymical Principles.

But yet because there are some generall Advertisements that do somewhat more belong to this part of our design'd Appendix that now comes forth, than to any of the rest, I must not deny them

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a roome in this Preface, which I shall conclude with them.

I might justly enough alledg, in excuse of incoherence of some of the particulars that follow next after one another in the subsequent discourse, that this being confusedly but a Collection (or if you please a Rhapsody) of loose Notes, 'tis more pardonable, than strange, that some of them should want apt connections, and the stile of the discourse they compose should want uniformity. But 'tis not so much my present Work to make Apologies, as to give Advertisements, and therefore I shall proceed to tell you in the first place, that though the following discourse have in some places a somewhat Dogmaticall dress, yet it is cheifely meant (as becomes an Appendix to a Sceptical Book) to excite and assist a further inquiry, and accordingly the reader may perceive it to have been my care, not so much to play the part of a Logical Opponent, as to take occasion to sett down variety of experiments and observations, that whatever Hypothesis about the Material principles of mixt Body's shall prove fitt to be pitch'd upon, it may be founded
on

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on a less insufficient History of matters of fact (relating to that subject) that Chymists have been wont to take in ; and may be so framed, as not to be lyable to those objections and difficulties , that will be here mett with , and yet perhaps were not thought of, or at least were not duely taken into consideration, when the vulgar Hypothesis of the Tria prima was establisht. Upon this account I am not without hope, that the following experiments and considerations, though propos'd by way of objections, may do some service to the inquirers into the material Principles of things; by obliging the Chymists, at least, to reforme their doctrine about them, and build it more cautiously, and that upon a larger, as well as more solid foundation of Natural History.

The second thing whereof I am to advertise the Reader, is that I would not have him infer from any thing that (prompted by the exigencies of my design) I have said in the following papers, that I either do undervalue, or would decry Chymistry, or Chymists themselves indiscriminately. For I have a very differing

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*differing esteem of the Notionall and of the Practicall part of Chymistry. For divers of the opinions maintain'd by Spagirists, without excepting their grand Hypothesis of the three Principles, I have been inclin'd to question not only as a Naturalist, but as a Chymist; as seeing great cause to doubt whether they be agreeable, either to the true grounds of Philosophy, or the exploring Experiments of the fire. But as for Chymical operations, such as Destillation, Solution, Sublimation, Precipitation, and the rest; especially those seldome sufficiently valued ones, Digestion and Cohobation, I take them to be excellent tools in the Hands of a Naturall Philosopher, and to be by him applicable to many other, and perhaps some nobler uses than they are wont to be put to, in Laboratories; since if they be skilfully employ'd they may be successfully so, as well to discover Nature, as to correct, to imitate, and in some cases to outdo her. Nor do I only thus distinguish between the Speculative and operative part of Chymistry, but I make a great difference between the ad-
vow'd Cultivators of that Art; and look not with the same eyes on the opinions
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and performances of vulgar Chymists, and Chymical Philosophers. For we are told that there lives conceal'd in the world, a set of Spagyristes of a much higher order than those that are wont to Write courses of Chymistry or other Bookes of that nature; being able to transmute baser Metalls into perfect ones, and do some other things, that the generality of Chymists confess to be extreamly difficult; and divers of the more judicious even among the Spagyristes themselves have judg'd impossible. The declaration of what I thinke of these latent Philosophers belongs to another paper. Yet in this I shall not deny but that what I have heard from divers very credible eye-witnesses, and perhaps some more immediate arguments, strongly incline me to thinke that there may have been, and may yet be, some such men, and whatever be to be thought of what they call the Philosophers Stone, I confess my self convinc'd by what I have seen, that there are in the World as difficult Arcana as divers of those which have been (perhaps not all of them justly) derided under the name of Chymicall non-entia. Now if there be really such adept Philosophers
as

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as we are told of; I am apt to thinke that among their other Arcana they are Masters of extremely potent Menstruums (which may, as far as I can guess, be some of their cheifest Tooles) and may by the help of these and other means peculiar to themselves, of working upon bodys, be able to produce in them, such alterations, as we have no examples of, and so obtain from them such similar substances, as either for number, or quality, or both, may be very different from the vulgar Tria Prima, or those substances Chymists are wont to obtaine, (for that word I chuse to employ rather than the word separate or Extract) by the common ways of what they call Analysis. For if a Man have an instrument which other men have not, and much more, if it be an excellent one, he may be able with it to performe other things, than they can without it. The Europeans by the helpe of so slight an Engine as a Mill assisted by a far slighter instrument a seive can easily divide Corne into Bran and Meal and Floure, which even those Americans, for want of those helpes, were not able to do, who could do other things that are thought far more difficult. And he that has a file and a good turning lath
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with its appurtenances, may obtain from a piece of iron both filings and shavings and concave Hemispheres and ellipses and Globes and Cylinders and other sorts of bodies, which could not be obtained from that Iron even by good artificers that were not furnish'd (as till of late very few were) with those instruments. And he that first found the use of Aqua Fortis in dissolving Silver, and that though it were mixt with Gold, had by his Menstruum an easy way of separating those two Metalls, though ancients Mineralists, Nor Chymists themselves had no liquor that would performe that worke. But Helmonts writings will supply me with a far nobler instance to my present purpose, if the truth of all that he delivers concerning the effects of his Alkahest be admitted, About the possibility of which strange solvent having elsewhere written a short enquiry, I shall forbear to say any thing of it here, but rather intimate that if there be such adept Philosophers as some speak of (which I thinke not Incredible) and if they have (which supposing there be such I think not unlikely) among other rare things some Alkahestical or other extraordinarily potent Menstruum, or way of penetrating and working upon mixt bodies; they may for ought I know be able to obtaine such substances from them, as may induce me, and perhaps the Chymists too, to entertaine other thoughts about the constitution of compounded bodies (as they are wont to be call'd) than either I or they now have. And therefore though as to Naturall Philosophy in generall I do not expect to see any Principles propos'd more comprehensive and intelligible than the Corpuscularian or Mechanical;

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cal; yet as to the subordinate Theory of mixt bodies in particular, I that have disputed only against the vulgar Hypothesis of the Chymists, can easily retain a disposition to receive further light in this matter, when those that are the best able to afford it us, and from whom it will be no disparagement for much greater proficients than I, to learn, shall think fit to oblige us by doing so. In the mean time, to end this advertisement as I began it; I should not need to say much to satisfy Chymists that I neither hate nor despise their Art, even in its present state, if some things and chiefly want of leisure, would permit me to publish an essay that I wrote many Years since, Of the usefulness of Chymistry to the Empire of Man. Nor is it only to the practical part of Natural Philosophy that I take Chymistry as it may be manag'd, to be highly usefull, but I confess I think also that being ordered by a skilfull Naturalist, it may far more conduce, than those that are strangers to it are wont to think, to the speculative part of Physicks; and that as the Babilonian Stone without being Chymically prepar'd would never be made Luminous, but being so prepar'd is brought to shine, so many other Naturall body's never afford much light to Philosophy, till Chymicall operations have qualified them to do so.

The Last advertisement I desire to give the Reader concernes the intention with which I call in question the Hypothesis of the Tria Prima and some other of the Chymists Doctrines. For though sometimes I have had occasion to discourse like a Scepticke, yet I am far from being one of that sect; which I take to have been little
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less prejudicial to naturall Phylosophy than to Divinity itselfe. I do not with the true Scepticks propose doubts to perswade Men that all things are doubtfull and will ever remaine so, (at least) to humane understandings, but I propose doubts not only with designe, but with hope, of being at length freed from them by the attainment of undoubted truth; which I seek that I may find it; though if I miss of it in one opinion I proceed to search after it in the opposite or in any other where it seems more likely I should meet with it. And to declare my mind to the disciples of the fire, by a similitude not alien from their profession: Suppose a Man more rich than skillfull should Bequeath me a purse of Guineys, and that I should have strong presumptions that some of them are counterfeit, what in this case would a Chymist have me do? To take them all for good in spite of contrary presumptions against some of them, were very imprudent. On the other side to throw them all away because tis probable some may prove counterfeit, were downright folly. That then which common prudence would direct me would be to take them all out and examine them one by one, first with the touch-stone, and then, if need be, by the Cupell and by Aqua Fortis too: and this I should do with desire to find all the peices true, having also care not only to preserve and put back into the Purse, those that prove right; but if any be but partly adulterated, to preserve the good portion by purifying it, (by the Cupel or some other fit way) from the falsifying alloy by whose admixture it had been imbas'd. The application of this I leave to be made by Chymists. And having in another paper purposely discours'd of the cautions and limitations

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imitations without which I disallow Scepticisme, I shall only in generall profess that I more willingly embrace the truths taught by the Chymists, than I endeavour to disprove their errors. For I looke upon truth as one of the cheife of those goods that God has of all others laid the most in common; since truth does not only, like desert Islands in America, belong to him that first finds it and seizes on it; but even when another has lighted on it and is in possession of it, any Man may without trespass or injury, make himselfe a sharer in it. To conclude; I am glad to find truth in the Doctrines of the chymists: but when I cannot discern it there, I chuse rather to seek it elsewhere than sit down without it. And if I any where seem to be somewhat too indulgent to suspitions against their Hypothesis, or arguments, I hope the usuall confidence to be mett with among most of them, consider'd; it will be look'd upon but as a compliance with the advise of Aristotle of bending a crooked stick the contrary way to reduce it at length to straitness. And I did with the less scruple allow my selfe this way of writing, because experience having taught me that some spagirists (for I speak not of all) that keep their best things close, will do more to Vindicate their art, or oppose their antagonists, than to gratifie the curious or benefit Mankind, I thought the rousing stile I sometimes wrote in, might prove no unhopefull way to procure somewhat considerable from those great Masters, and orders of Chymicall Arcana, that must be provok'd before they will come out with them; as the sea is observ'd not to give us one of its preciousst treasures, Amber-greece; till it have been agitated by winds and stormes.



The Publisher's Adver-

tisement to the

R E A D E R.

I Shall not entertaine the Reader with any thoughts of my own, about the following Appendix, which, without desiring to prepossess him, I shall willingly (and I thinke may safely) leave to speak for it selfe. But yet I think it may not be amiss, if I premise something to the Reader, about the publication of these Notes, as having been particularly concern'd in it.

By the opportunity I had of seeing some papers, of the Honourable Author of the ensuing Appendix;

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The Advertisement.

I perceived that the Notes which be design'd it should consist of, were indeed most of them laid together in some (though but a careless) order, and so were without much difficulty fitted for the Press: but others of them lay scatter'd up and down amongst many others, about differing subjects in his Philosophical Memorials, which particulars not being ready at hand, when the Ensuing Notes were sent to Oxford to the Printer, they could not be publish'd with the rest, but must expect some other opportunity, to appear abroad, either alone; or in their company.

Perhaps the Reader will not need to be told that besides the Application of some of the Experiments contained in the following Notes, most of the Experiments themselves are new. But so many years are past,
betwixt

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betwixt the first Edition of the Sceptical Chymist, and the second that now comes forth; that it may be requisite (though otherwise it would be improper) to advertise this Reader, that he is not to think, that the Author has borrowed from others those Experiments and Notions, that may be met with in Bookes written in later years, as well as in the Sceptical Chymist. For the first English Edition having been put forth in the year 1661. and never since by the Author at all enlarg'd, or alter'd; 'twill sufficiently shew, that this Book could not borrow from those that never were seen till after, and perhaps long after his was published. Which Advertisement may be particularly apply'd to the late Learned Treatise, Intituled *Philosophia Vetus & Nova*, wherein in one long Chapter may be

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met with an *Abridgment* of a great part of the *Notions*, *Experiments* and *Ratiocinations* of the *Sceptical Chymist*, without any mention there made, either of the great and famous *Authors Name*, or his *Book* in which they first appear; Though the *Latine Version* of that *Treatise*, was publish'd many years ago, and reprinted many times since. And though this be not the only *Writer*, that hath thought fit to make use of considerable portions of the *Scepticall Chymist*, without owning it, I thought, what he has been pleas'd to do, required to have particular Notice taken of it: because, though his modesty hath perswaded him to conceal his *Name*, his *Learned Book* hath made him so justly famous, that if the *Reader* were not advertis'd, he might easily suspect, that *Mr Boyle* had not lent to, but borrow-

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The Advertisement.

ed of an Author, who appears so capable of enriching the Curious with excellent things of his own. And upon the same grounds I thinke it necessary to observe, that the Experiments to be met with in Mr. Boyles Histoy of Colours, having been publish'd many years ago, could not be borrow'd from that most ingenious Treatise, though in that Chapter of it which treats de coloribus, between 20. and 30. Experiments, (If I misremember not the number) will be found the same with the like Number of Mr. Boyles; whose Name, though elsewhere very civilly taken notice of on some other occasion, is in that whole Chapter left unmention'd.

I might here informe the Reader, that the Sceptical Chymist having been many years out of Print, it chanc'd that when the
Notes,

The Advertisement.

Notes, that make up the following Appendix, were drawn together for the Press, this Author had not a Book at hand, by comparing whereof with the particulars of his design'd Appendix, he might be sure to avoid, (what he now but hopes he hath;) the suffering any thing to passe in the latter, that is truly coincident, with what was already extant in the former: (I mean, to the same purpose, and on the same occasion; for otherwise an Experiment or Notion may be more then once employ'd without meer Repetition.)

And lastly I dare not omit to let the Reader know, that since the Appendix was printed, it appears, that by an oversight, some leaves were left behind, that treating of the difference of Common Mercury's themselves, should have been annex'd, as a kind of Appendix, to the last of the
three

The Advertisement.

*three Mercurial Tracts, to be met
with among the following papers :
from whose perusal the Reader shall
no longer be detain'd by*

His

Humble Servant

I. M.

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Main body of handwritten text, appearing to be a journal entry or a list of notes, covering the majority of the page.



THE
INTRODUCTION

to the following

NOTES.

THough the Pompous title of *Hypoſtaticall Principles*, which Chymiſts have beſtowed upon the Ingredients they would have mixt bodies to conſiſt of, has perhaps ſerv'd to procure them a veneration from vulgar Heads, that are wont to eſteem things the more becauſe they underſtand themleſs; yet the maine thing, that has recommended the Chymical Principles to more diſcerning men, ſeems to be, that by the help of a few ſimple Ingredients (whereof nature is ſuppos'd to have laid up great Magazines at the beginning of things) aſſociated in differing proportions, all mixt bodies

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may

may be compounded: and so men may acquaint themselves with the natures of a multitude of bodies, by first knowing the natures but of a few. He therefore that acknowledges he does not acquiesce in the Chymicall Hypothesis of the *Tria Prima*, or their's that add to them *Water* and *Earth*, can scarce employ a more proper Argument to shake it, than, upon good ground to call in question what they teach when they affirme *That their Principles are ingenerable and incorruptible*, and that Nature does only compound and dissociate them, without either producing or destroying any of them. It will be therefore very well worth while to examine, what evidence there is in an Assertion, which, in so many of the Chymists Reasonings and explications is either manifestly imploy'd or not obscurely suppos'd. And indeed this Tenent of theirs is so principall a Pillar of their Hypothesis, that, in case it faile them the whole structure will be in danger of ruine. For if the Bodies they call Principles be produc'd *de Novo*, how will it be demonstrable

demonstrable that Nature was oblig'd to take those Principles made ready to her hand when she was to compound à mixt body, and how will it appeare in every *Analysis* made by fire, that the Salt (for instance) thereby obtain'd was not produc'd by the Chymicall operations, but was preexistent in the body in minute parts, which by the action of the fire were only extricated and separated from the other Principles or Ingredients, and afterwards brought together: since in case the Chymical supposition be erroneous, not only the obtained Salt may be in part due to a new Production or Transmutation, but part of that which was really salt, if any such thing there were antecedently to the Analysis, might be either destroyed by the operation, or made to appear under some other forme.



O F T H E
P R O D U C I B L E N E S S

O f C H Y M I C A L L Principles.

The first Part.

Of the Producibleness of Salt.



Mong the substances upon which Chymists have conferr'd the Title of Principles, *Salt* seems in their estimate to have had the Precedency, since they are wont to name it first in the enumeration of their *Tria Prima*. And 'tis generally granted, that *Salts* are wont to be the most considerable and active parts obtain'd by Chymists from mixt bodies. And yet perhaps
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the invifible particles that compofe the vifible portions of a Salt may be fuch, and fo conftrued, as to be fit to make and to have perhaps actually made other portions of matter endowed with thofe Qualities, for which Chymifts are wont to call a body fuphureous or mercurial, as may be instanced in the *Inflammability* of Nitre. Wherefore it may deferve a greater meafure of curiofity, than feemes to have been employed or even defign'd by vulgar Chymifts, to enquire, whether *Salt* indefinitely fpeaking, may be produc'd *de Novo* (as they phrafe it) or deftroyed; and whether at leaft the particular, and much differing, *Species* of Salts may be changed into one another, and thereby after a manner be produc'd in reference to the acquired *Species* of Salt, and deftroy'd in relation to that which the fame portion of matter belong'd to before.

To premife fomewhat in generall to render it probable that *Salts* may be produc'd *de Novo*, I fhall briefly represent two things: The *first* is, that fince *Salts* differ much in feveral other

ther attributes, some being *fixt*, some *volatile*, some *Acid*, some *Urinous* &c. the two qualities wherein they agree, and which therefore make up the common and most received Notion of *Salt* in generall, are, that it is easily dissoluble in water and that it affects the Palat. with a sapor, whether good or evill: and *the other* thing, is, that whether we allow the *Epicurean* Hypothesis or the *Cartesian*; the first Saline Concretions that were produc'd by Nature must be confess'd to have been made of Atomes, or of Particles, that before their conjunction, were not Saline; and therefore there appears no absurdity in conceiving that by the action of the fire or other fit Agents, small portions of matter may be so broken into minute parts, and these fragments may be so shap'd and connected, as, when they are duely associated, to compose a Body capable of being dissolved in water, and of affecting the organs of Taste.

That a Disposition to be dissoluble in this or that liquor may be acquir'd by mixture and the new Texture

ture of parts, is not without example, for as I elsewhere observe, though powder'd sulphur will lye in well rectified spirit of wine, some Weekes or Months, without being at all visibly dissolv'd in it, and though the same liquor will for as long a time swim upon Salt of *Tartar* without making a solution of it; yet if this Salt and Sulphur be mixt together, spirit of Wine will in less than an hour and sometimes in less than a quarter of that time dissolve enough of this matter to be richly colour'd by it, and this without the help of external heat. And I see not, why it should be impossible that the action of the fire, may reduce the Corpuscles of bodies to such a minuteness, and associate them either among themselves or with the Corpuscles of other Bodies which without preparation will not dissolve in water, that the pores intercepted between them may be enter'd & their loose Texture dissolv'd by that *Menstruum*. Of which Conjecture though we have not a perfect instance, yet we have a Probable one in that which I shall hereafter

after deliver concerning the making of Fixt *Nitre*. For though the Chry-
stalls of well purifyed *Salt peter*
may be kept many weekes or months
in an ordinary Lodging chamber (for
I had not occasion to try it In a
cellar) without relenting by the moi-
sture of the Air; yet if without the ad-
dition of any body dissoluble in water
or moist aire it be in great part re-
duced, as perhaps it may be almost
in a trice, to a fixt *Alkali*, this Salt will
be easily enough penetrable by the
vapours that rove up and downe in
the Aire, and will by that moisture,
in no long time, be brought to re-
lent, and at length will be resolved into
a liquor very Analagous to that which
the Chymists make of Salt of *Tartar*
left in moist Cellars to deliquesce.

As for the *Sapor*, which is the
second Qualification to be considered
in the vulgar Notion of a Saline body,
I doubt, whether the necessity of it
be agreeable to another Principle of
theirs, and to experience. For 'tis
plaine that chymicall oyles, even those
pure ones that they call *Essentiall*, or
even *Ethereal* ones, are highly sapid:

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and

and yet, these not dissolving in water, it seems there is no strict connection betwixt being saporous and being soluble in that liquor; and that, if bodies be reduc'd into a multitude of Parts minute and sharpe enough, 'tis very possible that some of these, either in part, or in Conjunction with others, may acquire a size and shape that fits them sensibly to affect the organ of Taste, though perhaps the Bodies themselves, or perhaps those Bodies that afforded them, are more of some other nature than of a Saline. This may be illustrated by these gross Examples: that a ball of glass, for instance, though whiles 'tis entire it will not pricke and hurt the skin, yet if it be broken and beaten, the little fragments will, not as they are glass, but as they have points or edges. And so, though a stick being grasped in a Mans hand, will not pierce the skin or put him to paine, yet if it be cut into Tooth-picks or reduced to splinters, their sharpness and stiffness gives them a power to wound, that they had not before. Something Analogous to what we in these examples

see

see to be done upon the organs of Touch, may be conceived to be done upon the organs of Taste (which is a kind of Touch) of which an almost full instance may be given in purified *Salt-peter*. For though this concrete have but a faint and languid Taste, yet if it be carefully distill'd with some Additament that is not dissoluble in water, and is insipid, the parts of it being by the action of the fire, either broken asunder, or cleft or rub'd, or ground against one another till they are reduced to edged and pointed Corpuscles: *Salt-peter* I say, thus treated, will be resolved into differing substances, each of which has an extreamly strong and penetrant Taste, which whence it should proceed but from some such Mechanicall change as we have been describing, is not easy to declare; and perhaps also the Phlegmatick liquor, that is wont to come over in this *Analysis*, may at least, as to part of it, be produc'd by the Operation of the fire, and so the Phlegme being insipid, the Taste, I meane as much as was in the unanalyzed *Nitre*, may be

as well destroyed as those of the spirit and *Alkali* are generated by the operation of the fire: But perhaps there needs no other Argument that the same parts of matter, according to its differing states, may have the qualities that Chymists would have to be proper to this, or that Principle, than what we have took notice of in Chymicall Oyles, which do more strongly affect the Taste than the most of Salts themselves are found to do.

Vide Hel-
montium in
Tractatu
dicto Ele-
menta. no.
II. &
alibi.

And to confirme our Doctrine of the Producibleness of Salts by the Authority of *Helmont*, which is very great; at least with the Chymists of his own Sect, I shall observe that he assures us, that by *Paracelsus's Sal circulatum* from solid Bodies, among which he particularly, and in the first place instances stones, may be transmuted into actual Salt Equiponderant to the body whereof it was made. So that upon the Chymists supposition, that in these mixt Bodies there is both Sulphur and Mercury, besides a *Terra damnata*, the same portions of matter that preexisted in the forme of either of those simple Ingredients, must

must by the operation of the fire, and an Anomalous *Mensivum* have been turned into Salt; and if the *Helmontian* Experiment be allowed of, whatever becomes of the Chymical supposition, we may safely conclude, that salt may be made of matter, that was not salt before, and consequently that salt may be *de Novo* produc'd. And thus much of the possible origination of Salts in generall, which I thought fit to premise to what I am going to offer about the Production of the Particular sorts of Salt. Though I have elsewhere enumerated and distinguished severall kinds of these Bodies, whereto Chymists have given the Title of *Salts*; yet those that more properly deserve that name and more directly appertain to our present disquisition, seem to be chiefly these three: The *Acid*, such as Vinegar, spirit of Salt &c. the *Alcalizate* or *fix'd Lixiviat* salts, made by burning, such as salt of Tartar, and of Wormwood, Barillia, Pot-ashes &c. and the *Volatile* and *Urinous* Salts, such as salt of Hirtshorne, of Urine, of Blood, of Soot &c. which taste and

smell like that of Urine. Wherefore, if we can shew, that these may be produc'd *de Novo*, or, (which we have intimated to be equivalent for our purpose,) *transmuted* into one another, we shall I hope be thought to have succeeded in our present Attempt.

I. SEC-

I. SECTION.

Of the production of Acid Salts.

AND to begin with *Acid Salts*, we see that even *sweet Wines* will but too often without addition degenerate into soure vinegar, which will dissolve Corall and divers stones, calcin'd Lead, and severall other minerals. The raine water that is imbibed by the roots of Trees is in those that bear Lemmons and Berberies changed into liquors, abounding with saline Corpuscles, that enable them to affect the Taste, and act on powdered pearles, and severall other Bodies as Acids are wont to do. Also *Guajacum* and divers other woods, that do not at all taste soure, will, being distilled in Retorts, afford spirits that are furnished with store of Acid particles, which, as I have tryed, will hiss upon *Alkali's*, and will dissolve Corall, and even lead it selfe calcin'd into *Minium*, and make *Saccharum Saturni* of it. Many other vegetable Bodies also

do, without addition, afford the like acetous liquors. And if it be objected, that these were preexistent in the Bodies whence they were obtain'd, and were only extricated by the operation of the fire, it will concerne those that affirme this to prove it, (which no body that I have met with hath yet done) and I shall the rather require it, because I find that the sweetest bodies and those of differing kinds, as (to omit, *Raisons of the Sun*) sugar and honey themselves, afford such a sort of spirits, which the tryalls, I elsewhere mention, shew to be sharp and piercing enough. To which may be added, that in divers cases, where we are sure that *Acid* spirits were plentiful ingredients of a composition, as in *Saccharum Saturni*, & that magistery which the Chymists call *Salt of Corall*, (which are not the only mixtures I have made tryall of,) experience witnesseth, that the liquor, which comes over by distillation in Retorts, is not *Acid*, but quite of another kind; I would not, by what has been said, be concluded to deny, that *Acid Salts* may in some mixt bodies,

dies, be so associated with others, and obscured by them, as not to be discernable by the Taste, till they be separated by the operation of the fire. But to shew that such Acid Salts were *de facto* preexistent, as acid ones in the Body that affords them, their must be some positive prooffe, other than the liquors distill'd from them, since they, as we have already argued, may be not barely *extricated*, but may have their acidity produc'd by the operation of the fire; And wee see, that Salt-Peter, though it have no Acid Taste, may be made to afford by (a certaine way of) distillation, above three quarters of its weight of a highly Acid liquor; and yet it appears not, that such a great proportion of *Acid particles*, or possibly any considerable proportion at all, was employed by nature in the composition of *Salt-Peter*. At least having distill'd Earth, that I caused in my own presence to be dugg out of a Pigeon house below th Dunge; I had from it a Salt indeed, and some little Saline liquor, but of a nature, as for as I observ'd, very differing from

from that of the Acid Spirit of *Nitre*.
(But this Experiment I mention occasionally without building upon it.)

Nor do I think, it ought to seem incredible, that *Acid Salts*, as well as others, should be producible by the various splittings, attritions, coalitions and changes of Texture, which may be caused severall wayes, and especially by the Operations of the Fire, which most active Agents making a vehement and various agitation of all the Minute parts that a body consists of, may consenantly to what hath above been intimated, split or breake some of them, and as it were grind others against one another, and in short, so alter their bulke, figure and motions, as to make them fit to stabb or cut the tongue, and the other bodies that they worke on, after the manner of those Bodies we call Acid. But of this you may find more in our Notes about the Mechanicall Origine of Tastes, wherefore I now proceed to the second part of my Taske.

The

The II. SECTION.*Of the production of volatile Salts.*

AS to the production of *volatile* Salts, we have an eminent Instance of it in the salt obtainable by distillation from *Soot*, for though the Woods we burn in our Chimneys seem not to have any thing of the taste or smell, of Urinous salt, nor have the dissolutions of the saline parts of such Woods communicated to water by their infusion in it, been observ'd (that I know of) to be of affinity in taste or odour with the salt of *Soot*; yet when Wood is first burnt in the fire, and then the *Soot* afforded by it is duely distill'd and rectified in fitly shaped vessels, there is obtained a spirit and a white volatile Salt, that in smell taste and divers operations by which we have examined them, appear to be of great affinity with those of Humane blood, or Urine, and may be easily enough mistaken for them.

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But this double operation of the fire is not alwayes necessary to the production of volatile Salts out of Vegetables ; for, though by their distillation in Retorts we generally obtaine from them no dry salt at all, but a sowerish Spirit, with which I have dissolv'd Corall, Lead, and other hard Bodies, that Urinous spirits have not been observ'd to worke on, and they will, being put upon Urinous salts, make such an hissing and conflict, as are look't upon as great tokens of antipathy ; yet I remember that severall years agoe, I did from Mustard seed, that had been kept for a convenient time, obtaine by distillation a volatile Salt, that fastned it selfe in prettily figured graines to the upper part of the Receiver, and this at the very first distillation, so that there was no need of rectifying the distilled matter to separate that Salt. And to enforce this prooffe by something more considerable than it selfe, I shall add, that by an easy way by word of mouth communicated to me by a very ingenious person (Dr. D. E.) one may, out of very
many

many vegetables first duely prepared, without adding any thing to them, by bare distillations in Retorts, obtaine good store of volatile spirits and salts, which by their fugacity, colour, smell, taste and divers experiments that I purposely made to examine them, were so like the salt and spirit of Urine, Soot, &c. that one, that knew nothing of the way they were made by, would readily have concluded they belonged to one or other of the newly named sorts of Bodies.

I remember that I have also sometimes produc'd a *Volatile Salt*, that one would readily have pronounced Urinous, of a *Minerall* it selfe; nor was that the onely *fossile* from which Experience perswaded me, that salt of this kind might be obtained.

Some other particulars relating to the production of *Volatile Salts*, I think fit to reserve, till I shall have occasion to mention them in another Section (as Instances of the production of Urinous spirits.) Only there is one thing, that I think not fit here to pretermitt, because I have not met with

with it in any Chymicall writer, the contrary being rather generally taken for granted ; I shall add then, that it is not universally true, that saline substances, that are Volatile and ascend in the form of salt, are of an urinous nature, and enemies to Acids. For I have had from Verdegrease distilled *per se* with a strong fire, a very acid spirit which being warily rectify'd, afforded first a sowre phlegm, and then a penetrant spirit sharper than it, leaving behind it in the vessel some few spoonfulls of a dark coloured liquor, which being sett aside, and suffered to rest, did in a great part, shoot into transparent Chrystalls large but thin, almost like those of Silver dissolv'd in *Aqua fortis* : They appeared prettily figured at the edges but were so odly connected among themselves, that I was not able to refer them to any of the known Geometrical figures; and their brittleness made them the less tractable, but their smell which was strangely piercing and not inoffensive argued them to be of the same nature with the Acid spirit which had come over with them.

But

But there is a more constant and easy way of producing such a Volatile salt, as my observation mention's. For if *Amber* be gradually and warily distill'd it will afford besides the phlegm, spirit and oyle, a dry substance which though the Chymists call the *Volatile salt of Amber*, I found to be really of an Acid nature, by several of those tryalls, by which we are wont to discern, that a body belongs to the family of *Acids*.

The

The III. SECTION.

*Of the production of Alkali's
or Lixivate Salts.*

THe third and last sort of Salts, which we are to endeavour to shew to be producible, are the *Alcalies* or *Fixt Salts*, which seeme to have an Antipathy with *Acid* ones, by making a conflict with them, and exercising diverse operations contrary to their's, (as I have in another Discourse more fully declared.)

Vide Hel-
montium
in Blas
humano
no. 38. &
43.

As for the Origine of these *Fixt Salts* of *Burnt Bodies*, the *Spagirists* are not of the same mind about it. For, the almost universall opinion of the *Chymists* that preceded *Helmont*, and the more common opinion even of later *Chymists* seems to have been, that these *fixt Alcalies* are preexistent in mixt *Bodies*, and that the fire does but separate or extricate them from the other parts of the compounded Body. But *Helmont* (followed in
that

that by severall Chymists that dissent from him in other points) has ingeniously conjectur'd , that these Lixivial salts do not preexist in their Alcalizate forme in the Bodies that afford them , but are Productions of the Fire , by whose Violent action a part of the Salt , which in the Concrete is naturally all volatile , lay's hold of some parts of the sulphur of the same Body , and both together are colligated and fixt into an *Alcali*, which Fixation he somewhere exemplifies by that which happens, when *Salt-Peter* and *Arsenick* , that are both volatile , being exposed to the fire , are by it's operation fluxt and made to fix one another. But though this account be ingenious , yet I doubt , whether it be so cleare and satisfactory , especially since 'tis applyed to *all* fixt *Alcalies* , as the Embracers of it thinke it. For, besides that it may be question'd whether it have yet been well proved (what *Helmont* teaches) that all the Salt of mixt Bodies before their combustion is volatile , it is not declared, what volatile salt is meant, though

*Vide Blasé
humanum.
No 41.*

though it be plaine, that some Bodies that afford a fixt Salt, do abound in Acid spirits, as Oake, Box, and many other Vegetables; and others, as Hartshorne, Blood, Urine &c. abound with urinous, that exercise hostility with Acids: And I have found that from some Bodies I could obtaine both *Acid* spirits, and such as are wont to be called *Urinous*. 'Tis not easy to explaine how the Volatile Salt comes to unite it selfe so intimately with the oyle (or sulphur) and though it be also volatile it selfe to compose with it a Body capable of enduring the violence of the Fire, since we have more than once tryed, that the Volatile Salt of Urine, or of Hartshorne, and a Chymicall oyle, as of Turpentine or any such, being put together, the Salt will indeed associate to it selfe some particles of the Oyle, but will nevertheless in their company sublime in the forme of a Salt, with a very gentle fire. And

Vide Hel-
montium
Complex:
atque Mist.
Sc.

the Example, that *Helmont* somewhere gives of Arsenick and Nitre, do's not satisfy me, because that when

when I made equal parts of those two Bodies to be mingled, and in a stronge 'Crucible fulminated together, a great part of the mixture was driven away by the fire, so little alter'd, that 'tis very dangerous to be too bold with the fumes, and a good part of what remained was fixt only in comparison of the crude Arsenick, but not comparably to Salt of Tartar, or some such other true *Alcali*; and the constancy of the part, that was more fixt, may probably be ascribed to the Salt-peter, which we know will without the help of Arsenick afford a great deal of fixt salt, if about halfe of it be burnt away, by the help of powdered Charcoal, or some other convenient additament. It may also serve to weaken this instance of *Helmont's*, that there are other instances, in which we may observe, that no such thing happens as his *Hypothesis* may make one expect. For common Sulphur is by Chymists said to abound in an Oyy part, upon whose account it is very inflammable, insomuch that they would have other inflammable Bodies to be

so, by their participating of Sulphur. That this concrete also abounds in Salt, is evident, according to their principles, by the acid *Menstruum* afforded by it, that goes under the abusive name of *Oleum Sulphuris per Campanam*. And yet these Ingredients, combin'd by nature, make up a Concrete which is so volatile, that both in close vessells and the open fire, 'tis almost totally volatile. And in that mixture of highly dephlegm'd spirits of Wine and Urine, that *Helmont* calls the *offa alba*, though the Urinous salts do manifestly combine themselves with the spirit of Wine, which being totally inflammable, the Chymists referr to their oyle, or sulphur, yet the coagulated mixture do's not by this association of Ingredients grow fixt, but proves very volatile. I will not here urge, in favour of the common opinion of the Chymists of the Preexistence of *Alcalies* in mixt Bodies, that a Corpuscularion may say two not inconsiderable things; whereof the first is, That there is no need of supposing a Colliquation of salts with Sulphurs, Oyles, or any thing

thing else to produce fixt salts ; since , besides that that supposition do's not explaine , how two volatile bodies come to compose one that is fixt , 'tis plaine , that a body yet more fixt may be made without any association of differing Principles. For the Earth , that together with the *Alcali* remains in the ashes of a burnt Body , is more fixt than the *Alcali* it selfe , and yet derives not its Fixity from any combination of Elements , or Principles , but from the grosseness , solidity , or weight , and unfitness for avolation of the Corpuscles it consists of. And the Corpuscularian may add in the *second* place , that whereas some instances are alledg'd wherein there is supposed a lessening of the quantity of the fixt *Alcali* of the Concrete , by operations that are said to carry off the volatile salt , before the Body comes to be incinerated ; It may be answered , that perhaps those very operations did but rarefy and volatilize part of the preexistent *Alcali* , and so left the less of it to be recover'd by burning ; as the Chymists tell us , that Fermentation rarefy's the

oily parts of the Juice of Grapes, and subtilizes them into vinous spirits, and so do's much lessen the quantity of the oyle. And when *Wood* is burnt in a Chimney, 'tis not in the forme of an acid salt, which is the only that is commonly observ'd to be driven away by Distillation in close vessels, but in that of an Urinous salt, (which is a kin to *Alcaly's*, and an Enemy to *Acids*) that the saline part of the wood is made to ascend; as may appear by the Distillation of Soot. Such Arguments as these, a Corpuscular Philosopher might, as I was saying, urge in favour of the more received Spagiricall opinions. But instead of insisting on them, I shall only invite you to take notice of what I observe in *Salt-peter*. For, though by distillation or any other way that we yet know, there is no oyle to be separated from it; yet above halfe the body of it may be easily and quickly turn'd into a fixt salt, in Colour, Taste, and Operation, much like that of Tartar, and other incinerated Vegetables. And such an *Alkali* I have made without the help of injected Coales or any other

other Body furnished with a combustible Sulphur; so that it seems not, at least universally true, that to the Production of an *Alcali*, there is necessary to be at hand an oyle, or Sulphur to be laid hold on by the volatile salt, and fixt together with it. But this Experiment is far more congruous to our Doctrine, which derives all those salts from the size, shape, and solidity or weight of the saline Corpuscles, since the same *Salt-peter*, whose greater portion may, by the operations newly mention'd, be reduc'd to a fixt *Alcali*, may, by being distill'd with a convenient *Bolus*, have its greater portion brought over in the forme of an Acid spirit or salt, which it selfe may afterwards be made materially to concurr to the Production of an *Alcali*. I might add, that even from one of *Helmonts* own Experiments, my conclusion may be inferr'd, since he somewhere, and, if I mistake not, in more places than one, affirmes, that by the addition of more Alcalizate salt and the operation of the fire, the Earth it selfe that is in the Ashes may be turned into Salt,

*Cinis proprio suo
Alcali fit
Sal mercur.
complex.
arque mist.
no. 12.
Idem Hel-
montius in
Blas. hu-
mano no.
39. videq-
sur.*

which if true, argues, that a fixt salt may be made of that which was not before either of saline, or of an oleous nature; and consequently without any such Combination of Salt and Oyle or sulphur, as his *Hypothesis* supposes. From which Experiment I may also infer the possible Origination of *Alkali's*, by the Mechanicall changes, that without the addition of oyle or sulphur the Operations of the fire may produce in the part of a mixt body; since Earth (excepting water) seems the most indispos'd of any part of the Concrète to be turned into fixt Salt.

I must not here pretermitt an observation that I have made, which seems to overthrow the opinion of those learned Chymists, who will have the violence of the fire to be alwayes a necessary Agent, as I allow it to be ordinarily, to the production of a fixt or lixivial *Alkali*. I said *seems to overthrow*, because I had not the opportunity to repeat my tryalls, and am not sure, that the Salt I employed was altogether genuine, in regard I cannot

not here in *London* meet with it, at any Rate; but I have great cause to thinke it was right, both for other reasons and because it was sent with other things, for a present out of the East, to an inquisitive Noble Man, who had been lately Ambassador for his *Brittish* Majestie at the *Ottoman* Court, and who was pleased as a rarity to present it me.

This *Salt* was affirmed to be the true *Egyptian* Nitre, mentioned so much by Ancient Writers: and indeed I found it to agree much better with the Notion, that books had given me of it, than with that sort, to which Chymists generally give the name of Nitre, and which is indeed the only Nitre, to be usually met with in our *European* shops: where it is best known by the vulgarly received name of *Salt-Petre*. But to say something of our *Egyptian* Nitre, though it be not pertinent to mention here all that I observ'd about it, yet I must not here omit two things, that I made tryall of, with that little, which escaped the misfortune that lost me all the rest, that

that seem considerable in the present occasion.

The first whereof is , that this *Nilotick* Salt was very apt to imbibe the moist aire , as calcined Tartar, and other fixt *Alcali*'s are wont to be , to which resolution we do not find our Salt-peter, if it be unmixt , dispos'd. But the other & more important thing I observed, was this, that having upon this *Egyptian* Niter, Crude as it was, poured spirit of Salt, this Acid liquor did presently, even in the cold, worke briskely upon it, as if it were a fixt *Alcali*, or at least abounded with such a lixivial Salt. And here upon the By, give me leave to take notice of a text of the holy Scripture, that has sometimes puzzled not only me, but far better Criticks in the *Hebrew* tongue than I. And it is a Passage to be found in the 25. *Chap.* of *Solomons Proverbs*, where to illustrate Things very incongruous to one another, the disagreement of Vinegar and Nitre is mentioned, for supposing the words to be rightly translated, as besides the Authority of

of I know not how many versions, the very sound of the *Hebrew* word *Nater* or *Nathar* argues it to be, it seems very hard to find what show of Antipathy there is between Vinegar, and the *Salt-peter* that is commonly sold in our shops for Niter; wherefore strongly presuming that *Solomon*, who reigned in *Judaea*, a country near to *Egypt*, and had much commerce with the *Egyptians*, whose Kings daughter he had marryed, made use of *Egyptian* Nitre as the best known, if not the only in his time and Country, and might have found in this Nitre, some quality very differing from any we find in our Salt-peter; as I remember that in the Prophet *Jeremy* Niter is Fer. 2. 22. mentioned, as a very absterfive thing, and fit to cleanse Womens skins, which is a knowne vertue of our fixt *Alcaly's*, but not observed in pure Salt-peter; wherefore when once I receiv'd the Niter that I have mentioned, and saw in it signes of an Alcalizate nature, I quickly poured upon it some strong Vinegar, and found as I expected that there presently ensued a manifest conflict, with noise, and store of bubbles,
with

with which Experiment I afterwards acquainted some Criticks, and other learned men who were not ill pleased with it. But this Theologicall use of the Alcalizate nature of Niter, not being that which I chiefly mentioned it for, I shall now make the Philosophicall use I intended, by taking notice that *Egyptian* Niter being acknowledged to be a Native Salt, and made only by the Evaporation of the superfluous water of the *Nile* (or some other such liquor) is yet of a lixivate nature, or at least abounds with particles that are so: Though as I freshly intimated, it was produced without any precedent Incineration, and the matter of it suffer'd not, or at least needed not suffer any violence of the fire, to make it afford an *Alkali*.

I have represented these things, not for that I pretend to be sure that *Alcaly's* may not be produc'd in multitudes of mixt Bodies, especially in a good number of Vegetables, after the way proposed by *Helmont*, or by some such like: But partly, because it seems not alwaies necessary to the existence
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of an *Alkali* in Nature, and to be the only way it can be produced by ; and partly because I would give you and your Chymical friends occasion to cleare (as far as they can) and confirme the doctrine I have questioned. 'Tis true that being a far greater friend to Truth ; than an Enemy to the Chymicall *Hypothesis* ; I would not stifle what may serve to advance that, in favour of *Helmonts* doctrine ; though this would never so well accommodate my present argument. But I have no great temptation to surmount in this case ; for it concerns very little the maine scope of this discourse, whether *Helmonts* way or any other, of the production of *Alcaly's* be embraced, since it will suffice for my purpose, if some Bodies belonging to this family, or kind of Salts may be produc'd ; I say some, because (as I have already intimated) I will not peremptorily assert, that all fixt *Alcaly's* are productions of the fire, or made by the help of it ; though I do not readily remember, that I have met with any (except *Egyptian Niter*) that are not. But I shall wave that question,

question, because my intended brevity calls upon me to proceed to the mention of some particular instances, fit to perswade us, of the producibleness of some *Alcalizate* Salts.

'Tis known that Chymists generally looke upon *Spirit of Nitre* and *Aqua-fortis*, as Liquors containing not *Alcali's* but *Acid* Salts, which they conclude not only from the Taste but from the great ebullition that is made, when those liquors are poured on the Salt of Tartar, fixt Nitre, Pot-ashes, or other such unquestion'd *Alcali's*. That Sea-salt likewise do's not containe *Alcali's*, is generally taken notice of; the spirit of it being justly reckon'd among the Acid ones, and when I purposely examined that Concrete by Distillation, the remaining Salt, though the fire had been violent, was very differing from *Alcalies*: And yet my conjectures inclining me to suspect what the event would prove, I severall times made the following Experiment upon Sea-salt, that yet retain'd all its acid spirit in it.

Upon

Upon well dried and powdered Sea-salt we put into a Retort sometimes an equall, and sometimes (which I preferr) a double weight of good spirit of Nitre, or *Aqua fortis*, and leasurely distilling all that would come over, we took out the dry salt remaining at the bottom, which we found much chang'd, both as to colour, (a good part of it being usually very reddish) and as to taste, which was differing enough from what it had been before, and might probably have been made much more so, if fresh spirit of Nitre had been once or twice more abstracted from it. This Salt being againe powder'd (for 'twas in a lump when taken out) and put into a Crucible, plac'd in a convenient fire, was by the repeated injection of fragments and well kindled Charcoal made to flash divers times almost like melted Nitre; and when it would flash no longer, the remaining matter being taken out did in great part appeare to be brought to an Alcalizate Nature, for it had a fiery taste upon the tongue: if Spirit of Nitre or *Aqua fortis* were poured on it,

it, it would make an Ebullition, it would turne Syrup of Violets green, and in short, exhibit diverse *Phænomena* of Alcalizate Salts.

Another way there is like that mention'd of making an *Alkali* out of Nitre, which is thus done; Pour upon it an equall weight, or halfe the weight of stronge oyle of Vitriol, and having diluted the mixture with a convenient proportion of faire water, distill it by degrees, till there remaine a substance very dry; powder This, and mix it well with about an eighth part of beaten Charcoal, keep them in fusion in a stronge and cover'd Crucible, till the mass grow very blacke, and a little of it, being taken out with a wire, taste fiery upon the tongue, (which may happen in about halfe an houre or an houre according to the quantity of matter, and degree of Fire) Then take out the blackest or deeply red mixture, which will very easily imbibe the moisture of the Aire, and you may finde it, at least whiles 'tis hot and dry, of a more fiery Lixivial Taste than Sale of Tartar it selfe.

selfe. It will make an Ebullition with Acid spirits, and precipitate diverse solutions made with them, it will turne Syrup of violets green, and in short discover it selfe many wayes to be of an Alcalizate nature, though it be associated with a Sulphur, that may by diverse methods be made appeare to be contained plentifully in it.

It is also considerable on this occasion, how the same Body, without the addition of any other Salt, may, by the various manner of the fires application to it, be made to afford, either little else than Acid Salt's, or a lesser or greater quantity of *Alcali*: For, if fine Salt-peter be dexterously distill'd with about thrice it's weight of some fit Earth, (but not as is usuall, with powder'd Bricks,) it will sometimes afford very near as much Spirit of Nitre as the Salt weigh'd, and though this like other liquors, be not without phlegmatick parts, yet besides that it may be doubted, whether most or many of them were not produc'd by the transmuting operation of the fire,

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we may suppose, that five parts of fix, or six of seven have been distill'd into dephlegm'd spirit.

*In the Essay of the differing parts and Redintegration of Nitre.

But if according to the way I have * elsewhere circumstantially delivered, (which is by frequent injecting into flux'd Salt-peter, small peices of kindled Charcoal, till one can make it flash no more at all,) you make fix'd Nitre, you may obtaine from Nitre thus handled halfe it's weight and perhaps better, of an *Alcalizate* Salt, that many would by it's taste and operations guess to be Salt of Tartar.

But to shew yet further how much the Production of this *Alkali* depends upon the operation of the fire, which as 'tis variously applyed, may vary the Texture of the Salt-peter, my Conjectures led me to try the following Experiment, which I did with success from the beginning; We tooke a pound of good Salt-peter, which was but grossly beaten (for it should not be finely powder'd) and having laid it on a Conical heap upon a flatt tile, that the aire might on all sides have access

access to it, wee Caused the upper part of it to be kindled by a little fragment of burning coal (which may be afterward thrown away :) then we caused the Laborant with an iron rod dexterously to stirr the kindled part of the Nitre, that the Ignition might be presently communicated to as many parts of the Salt, as was possible ; and this nimble stirring of the Mass, that the fire might be more diffused, and more parts might be obverted to the Aire, we caused him to continue to the end of the operation: by which method within few minutes, we obtained, more than once, out of 16. ounces of Salt-peter, about 10. ounces or better of fixed Nitre, very lixivial in taste and operation ; and for the colour it was of a pleasant greenish blew, and deeper than Salt of Tar-tar will usually be brought to, by being (in a Crucible,) kept twenty times as long, in a good fire.

The other scopes and uses desin'd in this new and quicke way of making the *Alkali of Nitre* belong to another discourse, the Experiment ;

which will scarce succeed without ad-
vantageous management, being here mentio-
ned to shew, what quantity of Alkali-
zate salt may by a differing opera-
tion of the fire, be obtain'd from
Nitre; which (crude Nitre) in
distillation skillfully made for the pur-
pose, may be in great part driven
over, in the forme of Acid spirit, and
Phlegme, and leaves so little true
Alkali behind it, that I have won-
dered at it, being sometimes scarce
able to find any at all, though I
purposely tryed to seperate it
from the Tobacco-pipe clay, which
the Peter had been mix'd with af-
ter a distillation, wherein not halfe
of the Salt had been driven into
the Receiver, in the forme of spi-
rit.

And to shew, that to make the
fixed Salt of Nitre, the Actual in-
flammation of it, in the open aire,
is not necessary, as very learned Men
have supposed, and that 'tis possible,
whatever is presum'd to the con-
trary, to make an *Alkali* of Nitre,
though charcoal, or some other
combustible Body be not added to
it,

it, to kindle the Corpuscles of the Nitre by its sulphur, and by the association of some part of the same Sulphur with the saline parts of the Nitre, to compose an *Alkali*; to shew this, I say, I more than once made the following experiment: With a convenient quantity of good Salt-peter we carefully mingled about an eighth part of tobacco-pipe clay, and putting the mixture into a Crucible closely luted at the top, we kept it by a fitly graduated fire, in fusion for some houres, and found as we expected, that the remaining Salt, (for part would get through the lute, or Commissures in the forme of fumes) was turned into an *Alkali*, of a faire blew colour, like the better sort of that fixed Nitre, which is made with Charcoal. This Experiment and that formerly made with Tobacco-pipe clay, seem plainly to argue, that to the making of fix'd Nitre, which is confess'd to be an *Alkali*, a congruous change of Texture may suffice, whether that change be attempted to bee made in open vessels, or in close ones, with, or

without the addition of the sulphur of Charcoal, or any other such combustible Body. Upon the same ground, that I had for trying the former Experiment, I attempted, and not without success, to make an *Alkali* of Salt-peter, by Colliquating moderate quantities of it, severall wayes, (and keeping it in fusion) with some Metalls: I say, *moderate quantities of Nitre*, because an Ingenious Gentleman, to home I communicated this Practise, could not make it succeed in any considerable quantities. And to obviate the suspicion, though perhaps groundless, that some Chymists might have of the material concurrence of a good portion of the combustible sulphur, presumed to be in the Ignobler metalls to the Production of the Nitrous *Alkali*; I shall add, that our Experiment succeeded, when we tryed it more than once, with more than ordinarily fine silver, whose Sulphur, if it have any, is granted to be fixt or incumbustible. And I remember the last Tryalls afforded us a blewish *Alkali*, though there were employ-
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ed but a fifth part of silver, in reference to the Nitre; and though the fire (which was continued for some houres) was so moderate, that the Merall, though thinly laminated, was not melted. And of an ounce, that was put in, there wanted but foure graines, which small loss might easily be imputed to diuerse accidents.

After what is said of the Production of *Lixiuiate Salts* and *Alkali's*, it will not be impertinent to add, that as they may, by the operation of the Fire, be produc'd, so by the operation of the fire, they may be destroyed or dispoil'd of their Alkali-zate forme, and turn'd into a substance of a Nobler nature. This I am induc'd to thinke very probable, by some Experiments, among'st which that which seem'd the most considerable was this: We tooke a pretty quantity of good salt of Tartar, that had been purifyed by solution and coagulation, and having put it into a Cleane Crucible, we kept it in a strong Fire (that made the Crucible red hot) for a good while; then giving

it at length a stronger fire, we poured it or (afterwards) tooke it out of the pot, and dissolved againe as much of it as we could in cold water, which being set to run through Cap-paper, there appeared, as I foresaw, in the filter a pretty deal of Matter, that would not (as the whole Salt had done at first) be dissolved in the water, but was turned into a kind of earthy Substance. Then coagulating againe the solution that had passed through the filter, into dry Salt; we exposed it againe in the Crucible to a strong fire, and putting it againe into water, we perceived it would not totally dissolve, but left in the filter a slime or mudd. And in this manner we proceeded to ignite, dissolve, filter, and coagulate the same salt of Tartar many times, for, if I much mistake not, it was 16 times, and still found such an earthy substance as has been spoken of, remaining in the filter; and the rest of the Salt of Tartar so little alter'd, that being somewhat tyred, and other wayes diverted, I desisted from prosecuting the operation to
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the uttermost, concluding it highly probable, that the remaining Salt, might by the same way of management be brought to yeild more and more, of that same substance, which either was earth, or of kin to it, being at least somewhat that was of a nature very differing from Salt of Tartar, since it was not like it, fiery on the tongue, and was indissoluble in water, as Earth, but not Salt of Tartar, is knowne to be.

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The IV. SECTION.

IT may bring some illustration and add some probability to what has been discours'd about the *producibleness of salts*; if we consider what happens in the Compositions and Decompositions of saline particles and their operations on other bodies and on one another. For if it appear that by these manifest and Mechanical wayes, such Alterations may be made and such qualities produc'd, as are either altogether or very near as considerable, as those which discriminate the several families of *Salts* formerly spoken of from one another, and form this or that Chymical principle; it will, I presume, be judg'd the more credible, that these families of *Salts* may be either transmuted into one another, or otherwise *produc'd*, and so may not be Primordial and Immutable beings in the sense wherein the Chymists would have them to be such. I have elsewhere taken notice of the Production of
Vitriols,

Vitriols, sal Armoniac, Borax, and
diverse other factitious salts, for
which reason, I shal not insist on
them here, the rather because it may
suffice for my present purpose, to
take notice of two Salts, whereof
the one is meerly factitious, and the
other such in great part, and yet
each of these by a very slight and
easie way of ordering it, afforded
me differing saline Concretions, some
of which resembled a Salt which
many judg the most simple and natu-
ral that we yet know of.

*In the Es-
say of the
usefulness
of Chymi-
stry to the
Empire of
Man.*

To show then, that common salt
it self that seems the most primitive
and simple amongst gross and visible
salts may be produc'd by a change of
Texture made in body's very diffe-
ring from common Salt, I shall recite
an experiment which though it have
sometimes failed me, yet it has di-
vers times answered my desire, though
I shall now relate but that single one
of my last tryals that succeeded
best.

That which our *English* Glassmen
call *sandever*, and the *French*, of whom
probably the name was borrowed,
suindever

Juindever, and is you know that recreation that is made when the materials of Glass, namely *sand* and a *fixt lixiviate Alkali*, having been first baked together, and then kept long in fusion, the mixture casts up the superfluous salt, which the work-men afterwards take off with Ladles, and lay by as little worth: This Salt seldome used by Mineralists and scarce wont to be mentioned by the writers of Courses of Chymistry, I have thought fit to employ about several purposes, invited thereto by considering the usual way wherein it is produced. For in *sandever* we have a Salt which was once altogether Lixiviate, but which having been kept long melted in a strong fire with sand (or flints or pebbles) must have had its saline corpuscles variously and forcibly ground or rubb'd against another, and against the particles of the sand, some of which it may also have dissolved and retained with it, by which rude justlings and mutual Attritions, I thought it very Probable, that the *Alkali* must not only have been considerably altered, but variously

ously too, some parts being changed more and after a differing manner than others, by which means *sandever* may consist of portions differingly qualify'd both in reference to the lixivate salt that was at first employ'd and to one Another.

We took a pretty quantity of good *sandever*, and having dissolved it in fair water, and filtered it, we set it to evaporate in a digestive furnace, till a saline crust, as if it were a thin plate of Ice, spread it self upon the top of the liquor, then suffering it to cool and chrySTALLize, we broke the mentioned cover to come at the ChrySTALLs, and set the liquor we had poured off from them to evaporate further and shoot again: and in this Method we proceeded whilest we judged worth while to do so; by this means we obtained good store of ChrySTALLs, whose figures were not the sam, but many of them differing enough, though most of them transparent and prettily shap'd, as if nature had at once affected variety in their figuration & yet confin'd her self to Geometrize; but the chief thing for which I mention this experiment,

periment, is, by this way of proceeding, I more than once obtain'd (not on the Very surface of the water, as is usual in the concretion of sea-salt) but in other parts, and Chiefly beneath the surface of the Saline plate formerly mentioned, a considerable number of grains of Salt, that better answered to the description of Common salt, than dissolved and filter'd sea-salt it self is wont to do; for these grains that were of no despicable bigness were as like little Cubs or die's, as if they had been made by a skilful Jeweller, and their Surfaces had a smoothness & glossiness much surpassing whatever I had observed in Marine or Common Salt.

I may confirm the difference I have mentioned to be between *sandever* and Common *Alkali's*, if I here add that some while ago having set a good quantity of filtered solution of *sandever* to coagulate in a cool place, & thereby brought a great part of the salt to coagulate into Chrystalls, almost like those of Nitre, but so very Diaphanous that divers of them were clear as roch chrystall it selfe; I did not observe them to relent by the moisture of
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the Aire in along time, though the Glass they were kept in were negligently enough covered with paper only, which argues their Texture to have been remote enough from that which is proper to *Alkali's*. And to shew that they were also Salts of a peculiar nature, I shall further observe, that if they were expos'd though but to a gentle heat, they would in no long time loose their Transparency, and be reduc'd to a white and fine *Calx*, which being weigh'd and redissolved in water, and made again to ChrySTALLIZE, would be Diaphanous, and concoagulate with it self so much of the water, as suffic'd to give a very notable increase of the weight

Sandever, which afforded me the first of the two Instances I promised you of the Production of salts, is one of those body's that many would reckon amongst those that are almost meerly Artificial. I shall now mention a second instance of a body wherein Art seems to have little to do save the easy extrication of its particles, from those wherewith nature had

had blended it in a Humane body: If then *Mans urine* after having been kept some weeks in a clos'd vessel be exposed to a moderate fire, first it will yield a spirit and a Volatile salt, and then a very copious phlegm, which being totally exhal'd there will remain a dry *Caput mortuum*, and this being warily calcined, dissolved in water, and coagulated, if the Experiment succeed with you as it did with me, you will find the Salt very different from a common Lixivate *Alkali*, rather you will find saline Concretions of differing formes, if not kinds; for I observed some to be oblong and to look like small-Chrystalls of Nitre, others to be of figures resembling those, that Geometricians call *Rhombus's* or *Rhomboides*; and one of the fairest of these Lozenges, I remember for tryall sake, I kept for many dayes expos'd to the aire, and that in winter, without finding it run *per deliquium*, as a peice of Common *Alkali* of that bigness would have done, in a litle part of that time. But besides those numerous saline concretions that

I could not easily reduce to any known figure, there was (which I chiefly expected and would have you take notice of) a considerable number of fine grains that lookt like common Salt, and were indeed more exactly cubicall in their figure, than the grains of sea-salt themselves are wont to be; And I have the less cause to doubt that the sea-salt abounding in our *Caput mortuum* was not a common lixivate *Alcali*, but consisted of parts of other natures, especially of such as compos'd sea-salt, because I observed, that the *Caput mortuum* when expos'd to calcination began early to melt in the fire, before it was near calcin'd, as not an *Alcali* but sea-salt would have done; also because the taste was much nearer to that of brine than to that of *Lixivium*; and because lastly it would make no conflict with the spirit of salt, as an *Alcali* would have done, but did make of a solution of silver in *Aqua fortis* a white precipitate like that we make of that metal with sea-salt, but not with *Alcali's*.

And because a mischance unseasona-

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bly de-

deprived me of the *caput mortuum* of domestick Urine prepared in my own Laboratory, I was fain to procure a supply of fixt salt of Urine made by a diligent Spagirist of my acquaintance, who had wrought much upon that liquor, and having dissolved and filtered a pretty quantity of this salt, and suffered the solution to evaporate slowly, till it began to have a skin, I found the Chrystals it afforded in a cool place to be some of them an Inch or two long, and shap'd almost like Chrystalls of Nitre, save that they were sharper at both ends, and to many of them were fastened store of minute and oblong Chrystalls prettily shap'd, which were placed almost perpendicularly upon the greater portions of salt, which by this means obtained a shape, not much unlike that which the French Engineer's call *cheval de frise*: these Chrystalls as they did not resemble common *Alkali's* in there figures, so they were unlike to them in divers other respects. For though some oyle of Tartar *per deliquium* being poured upon some of them, there ensued no manifest

manifest commotion, as is wont to be produc'd when that liquor is mixt with a salt, where an Acid is predominant, yet being beaten and mixt with an Acid spirit as that of Common salt, they made not the least ebullition or conflict, though they were stirred up and down to excite it, nor did *aqua fortis*, good enough to be worthy of that name, produce any hissing noise or froth when it was put upon the salt of Urine, though at length it dissolved a good proportion of it. And though strong oyle of Vitriol being put upon some of the forementioned Chrystalls, did readily work upon them and in corroding them excite a good number of bubbles, yet that did not surprise me, nor make me conclude the salt to be Alcalizate, because I have observed oyle of Vitriol (the not spirit of salt or *Aqua fortis*) to work after the like manner upon common salt, of which that the fixt salt of Urine did participate I judge very probable, partly upon the account of the *Phænomenon* newly recited, partly because I found that by impregnating

good *Aqua fortis* with a competent quantity of the fixt salt instead of dissolving in it sea-salt, I could make it capable of corroding foliated Gold, even in the Cold; and partly also, because that some part of the solution of our fixt salt, that was more slowly coagulable, being mixt with oyle of Tartar, presently grew thick and muddy, and soon after let fall a precipitate copious enough: And another part of the same solution did readily precipitate Silver dissolved in *aqua fortis*, but would not so much as discolour a stronge solution of sublimate, (made in fair water) from which a common Lixivate *Alkali* would have immediately struck down an Orange coloured powder.

A light suspicion I once had that the common salt, that most men eat to season their Aliments, may in some degree impregnate *Mens Urine*, gave me the Curiosity to examine that of *Horses*, which I found to require rather a shorter than a longer putrefaction than Humane Urine to make it fit for distillation; but the *Caput Mortuum* of this also, I was by an accident

accident hindered to examine sufficiently, but by the spirit and Volatile salt the liquor after putrefaction easily afforded, it seem'd probable enough, that the fixt salt would have been not unlike that of *Mens Urine*; of which last nam'd olid and despicable liquor I chose to make an Instance in this place, because Chymists are not wont to care for extracting the fixt salt of it, (which is therefore commonly presumed to be like other *Alcali's*) but as soon as they have distill'd the saline spirits, throw away all the rest as nothing worth : which practice, as generall as it is, I cannot commend, for though I am not altogether of *Helmonts* mind, where he saies, that *Wisdom despises those that despise the indagation of Urine, and refuse by the fire to search out its Contents* ; yet I think that those who understand the mystical writings of some of the best Chymicall Philosophers of former times, will look upon it as a more tolerable *Hyperbole*, than other Men or even Vulgar Chymists imagine it to be.

The Second Part.

*Of the Producibleness
of Spirits.*

The I. SECTION.

Of the Production of Vinous Spirits.

AS for what the Chymists call *Spirit*, they apply the Name to so many differing things, that this various and ambiguous Use of the *Word* seems to me no meane proof, that they have no cleare and settled Notion of the *Thing*. Most of them are indeed wont in the generall, to give the name of *Spirit* to any distill'd Volatile liquor that is not insipid, as is *Phlegme*, or inflammable, as *Oyle*. But under this generall Terme they comprehend liquors, that are not only of a differing, but must be, according to their Principles, of a quite contrary nature; some of them being *Acid*, as Spirit of Nitre, of Salt, and of Vinegar

it

it selfe; and some of them *Urinous*, or, as some would have it, *Volatile Alkali's*, which are such Enemies to the former, that, as soon as they are put together in due proportions, they tumultuate and grow hot, and usually continue to fight till they have disarm'd or mortifyed each other. Besides these two Hostile Families of Spirits, there is a third sort, which they call *Vinous* or *inflammable*, which though very subtile and penetrant, is not manifestly either Acid, or Alcalizate; I say, manifestly, because the Taste and smell of this sort of Spirit is differing from both the sorts last named; and yet is referr'd to one, or the other of them, by some Learned Spagirists; with whom I neither need, nor desire to dispute about this matter; since it may suffice for my purpose, if it can be made out, that all the three sorts of Spirits above mentioned, the *Vinous* or *inflammable*, the *Urinous* or *Alcalizate*, and the *Acid* may be produced, and consequently may be other than Primevall bodies.

And to begin with the first named, these *Vinous* Spirits are so producible

by Art, that we seldome find them produced by nature alone, which does indeed make the Juice of Grapes, but does not make wine, nor the Spirit of wine, unless, by the help of Man, that juice be press'd out, and fermented. And the case is yet more plaine in the ardent Spirits made of Ale, Beere, and in the like vinous spirits made by the decocting and fermenting the seeds and other parts of Vegetables. And 'tis observable to our purpose, that *Must* (or the Juice of grapes newly press'd out) does not in distillation yeild a Vinous and inflammable Spirit. And I remember, I had once the pleasure to laugh at a Man, otherwise very ingenious, who, to catch the subtile Vinous Spirit that he would have me thinke was lost in the common way of handling wort, made it worke in a huge Copper Limbeck, to catch the Spirituous parts that he thought would otherwise fly away; by which meanes, instead of the ardent Spirit he expected, he got nothing in his Receiver but a nauseous Phlegm. I have also found by Tryall, that *Raisons* (which

(which we know are but dryed grapes) being distill'd alone afforded an *Acid* and Empyreumaticall, but not a vinous Spirit, whereas, when I carefully fermented them with a due proportion of water, they would afford me in distillation an ardent spirit like that of wine.

If it be objected, as I presume it will, that the Vinous and inflammable Spirit, that is by fermentation obtained from body's, was actually in them before, and is only extricated by Fermentation, I answer, that this is *Gratis dictum*, and is therefore not to be admitted till it be proved; since Raïsons, and such other Fermentable body's do not, upon the supposed *Analysis* made by Distillation, afford a Vinous Spirit, but one that is very differing from it. And I see not, why the change of Texture may not turn some part of the Juice of Grapes, into a Vinous and inflammable liquor, since a little further change is able to turne the same Juice into a liquor that is *Acid*, and neither Vinous nor inflammable, as 'twas before. And I have found
by

by tryall, that even this Vinegar ; crude as it is, being Satiated with *Calx of Lead* made *per se*, would afford a Spirit not acid, but of a very differing Taste, and inflammable, like the spirituous parts of wine. And if it should be further objected, that these inflammable Spirits were not produced by these operations, but, preexisting in the newly express'd juice of Grapes, were only extricated by Fermentation, and being afterwards cover'd or disguis'd by the acid particles of the Vinegar, were againe extricated by distillation, the Acid salts having fixt themselves upon the Lead they corroded, and thereby given the Spirits leave to forsake them. If I say, this be objected, I might referre you to a more full answer that I have elsewhere given. And at present it may serve the turne, that I put you in mind againe, that the Objection alledges no *Phænomena* to make appeare the actuall pre-existence of vinous spirits, either in the juice of Grapes, or in the solution of Lead.

And though I need but deny what is barely affirmed, not proved; yet
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to examine this matter further than I had found others to have done, I did (as I elsewhere mention) make a *Saccharum Saturni* with an Acid liquor made without Fermentation, or the Addition of any liquor, from Wood it selfe; and then, distilling it also without any Additament, I had, (as I expected) a Spirit that readily took fire and burn't away in a blew flame, like that of Spirit of Wine. I know another Objection may be framed from the doctrine of some Chymists, who would have Spirit of Wine to consist of the oily parts of the juice of grapes rarefied and subtilized. But with these learned Men (for such I know some of them to be) I have not here any need to enter into a dispute, since, without examining whether their opinion be true or no, if it be admitted, it will be consistent enough with mine. For to say, that by subtiliation, rarefaction, a peculiar kind of Commixture with the Phlegm, or the like meanes, the oyle contained in the Juice of Grapes, (and seperable from it, in the forme of Oyle, if

is

it be distill'd before it be fermented;) becomes spirit of Wine, is but to assigne the *Modus* whereby Vinous Spirits are produced, but not to deny there Production. And all that my purpose requires, is, that it be proved or granted, that inflammable Spirits are really produced, by what way soever they come to be so. I shall add, that though experience Witnesses, that Honey being skillfully fermented with a due proportion of water, will yeild a greater plenty of inflammable Spirit than the Wine it selfe, that is made in diverse Countries, yet when we have carefully distill'd Honey before fermentation, it afforded us a great proportion of considerably acid Spirit, that would dissolve some Metalls, but so little oil, that the paucity seemed strange, and made it appear unlikely enough, that so inconsiderable a proportion of that liquor, should be rarefiable into so much ardent spirit, as may be obtain'd from well fermented Honey.

The II. SECTION.*Of the Production of Urinous Spirits.*

I Proceed now to the other sort of Spirits, as those of Hartshorne, Blood, Sal-Armoniac, soot, of wood &c. That we have formerly call'd *Urinous*, because of their great affinity in many Qualities, to the more familiarly known liquor, *Spirit of Urine*. But as for these, I know not, whether it will be necessary to treat of their Origine apart; since, for ought Experience has yet assured me, these Spirits are not simple but compounded bodyes, consisting of the Volatile salt of the Concrete that afforded them, dissolv'd in the Phlegm, and for the most part accompanied with some little oil, at first undiscerned by the Eye though afterwards it grow Visible. The presence of this Oil in most Spirits, belonging to this family, may be probably argued from the deep Tincture

ture that in proceſſe of time, ſpirit of Hartſ-horne, of Blood, and di- verſe other ſubjects, will acquire by ſtanding, though preſently after their diſtillation, and Firſt or ſecond Re- ſtification, they were cleare, and colourleſs as water: The oily portion, which, whils't 'twas in very minute par- ticles, lay conceal'd in the mixture, becoming diſcoverable in proceſſe of time by their extricating themſelves a little, and aſſociating, though not ſo farr as to emerge and ſtore, yet far enough to diſcloſe themſelves by the colour they give the liquor. But in Spirit drawn by the help of an *Alkali* from *Sal-Armoniac*, a Concrete not abounding in oily parts, like Hartſ-horne, blood &c. kept not only for many months, but diverſe yeares, I obſerved no ſuch diſcolouration, which was one inducement to make me, in ſpeaking of the Oleaginousneſs of Urinous Spirits, to employ the word *moſt* rather than the word *all*.

Having therefore hitherto by Reſti- fications and Digestions obſerved no- thing in theſe *Urinous Spirits* but a *Chriſtalline Volatile Salt*, moſt com- monly

monly seperable in a dry forme, and the *Pblegm* it was dffolved in, besides some *Oleaginous Particles* that had (though at first unperceivedly) associated themselves to it; I see no great need to trouble you, with particular Instances about this sort of Spirituous liquors ; what has been said ; making it allowable for me to referre you , to what I deliver about the *Production of Salts* , where that of *Volatile* ones is mention'd.

The

The III. SECTION.

Of the Production of Acid Spirits.

AS for *Acid Spirits* that some of them may be generated or produc'd *de Novo*, seems probably deducible partly from what has been already delivered (in the first part of these notes) concerning the Production of *Acid Salts*; and partly from what will be ere long recited of *Acid* as well as of *Urinous* and of *Vinous* Spirits, obtain'd by distillation from one and the same body. And if we take the word *Acid*, as I usually do in these notes, in a familiar sense, without Cryptically distinguishing it, from those savors that are a kin to it, perhaps the spirit of sea-salt and that of Nitre may be fitly enough propos'd as Instances of the production of *Acid* spirits. For though *sea-salt* and its distill'd liquor have upon some bodies the like operations;

as either of them will precipitate silver out of *Aqua fortis*; yet not only the taste of the spirit of salt (especially that which rises last in distillation) is exceeding different from that of crude salt; not only in strength and penetrancy, but in this, that, the spirit is highly acid: Whereas the crude salt has a taste not properly acid, but that which by a distinct name is in *Latin* commonly call'd *Salsus*, such as that which predominates in Brine; and it does not appear, that this acid spirit did as such preexist in the salt whence it was obtain'd, so that we may suppose it to have been made rather by transmutation, than extrication. And the like I think may (and that with greater probability) be said of the spirit of Nitre; for though this be highly acid; yet the Nitre that afforded it is not at all sensibly acid; and this new vehement taste of the spirituous parts, as well as their great efficacy in dissolving Metals; and divers other bodies, seems to have been produc'd by the Violent action of the fire, (agreeably to what I formerly noted)

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which by cleaving the Nitrous corpuscles, or by rubbing them one against another, or by both these wayes, and perhaps by some others, makes a comminution of them into fragments or particles, which both because of their smalness and lightness may be elevated by the action of the fire, and because of the same Minuteness and their sharp and pointed figures may gett into the Pores of many other body's and divide their parts. I know that Chymists may object, that all the Acid spirit that can be destilled from Nitre, was really pre-existent in it, and only clogg'd and disguis'd by the *Alcalizate* Ingredient Wherewith it was associated, as may appear by what I my self relate of the speedy way of making *Salt-Peter*, by putting a due proportion of the spirit of Nitre to the *Alcali*, or fixt part of Nitre, that remains, after the *salt-peter* has been fulminated or burned. But to this I answer, that this proves indeed, (what I readily grant) that *Salt-peter* may be Artificially compounded of a Nitrous Spirit and a fixt *Alcali*, but does

does not prove that Nature does al-
ways, or so much as ordinarily pro-
duce Nitre by the same wayes, that
is, by compounding it of the same
Ingredients: for it does not appear,
that wherever *salt-peter* is generated
in the Earth, Nature has before hand
laid in a provision of Lixivate Salt,
which (at least in these Countreys)
is not wont to be made without
the violence of an incinerating fire
and of Corrosive Spitts, to obtain
which or either of them, Artists are
fain to employ Vehement fires; where-
as it seems that *salt-peter* is slowly
generated in the Earth by gradual
or successive Alterations of some I-
doneous Matter, wherein for ought
I have observed, not an *Acid* but an
Urinous salt is predominant, as may
be made probable by what I have
formerly related about Earth, that
had long lain covered with pigeons
dung in a dove-house, which I found
in Destillation to yeeld a *Volatile* spi-
rit and salt, much like those of *U-*
rine. Therefore I will not affirm,
that Nature does never employ *fixt*
Alcali's and *Acid Spirits* to make

salt-peter, yet I see not that Chymists have hitherto given us, or perhaps offer'd us any cogent proof, that she must necessarily do so. I further observe this more considerable Argument, that, according to what I formerly noted, *salt-peter* destill'd in close Vessels afforded us but an inconsiderable quantity of fixt salt, and that too, was but a very imperfect *Alkali*; though the quantity of *Nitrous Spirit* was great enough to perswade us, that not anything near so much as was wanting of the entire weight of the *salt-peter* had pass'd into the Receiver. And, elsewhere I relate, that a freind of mine with the helpe of a peculiar Clay obtain'd near a pound of Spirit of *Nitre* from a pound of *salt-peter*; whereas on the other side by a differing way of Managing it, and without Additament, I obtain'd, as I there relate, about ten ounces of fixt *Nitre* from a pound of *salt-peter*: whence it seems probable, that the same substance that in crude *Nitre* is almost insipid, may by an operation of the fire be de-

still'd

still'd into a highly *Acid Spirit*, as well as by another operation and way of management, be brought into the nature of a fixt and Caustick *Alkali*. It may also be worth considering, whether the Spirits of *Nitre* themselves, when after being made *sui juris* they compose a distinct liquor and are specified, may not be depriv'd of their *Acid Nature*, and may become or at least materially concurr to make up a fixt *Alkali*: For if sea-salt, which Chymists do not pretend to contain any such *Alkali*, be thorowly dissolved in a sufficient quantity of *Spirit of Nitre*, and impregnated, this compounded salt will, as I have formerly noted, yeeld a considerable proportion of fixt *Alkali* like that of *salt-peter*, which is as likely to proceed from the Nitrous, as from the Marine part of the resulting salt; and if it do, it will make it the more probable, that it is not necessary, that the saline corpuscles of *Spirit of Nitre* should be primordial bodies, since they may be destroy'd or turn'd into o-

ther salts, which is not less repugnant to the nature of a *Principle*, than 'tis to be *De Novo* producible from a body that was not *Acid* before.

The

The IV. SECTION.

I T may add much probability, to what has been above discoursed, concerning the producibleness of the differing sorts of *Spirits*; if it shall appeare, that the same body, meerly by different wayes of ordering it, may be easily enough brought to afford, either *Acid*, or *inflammable*, or *Volatile* commonly called *Urinous* spirits, as the skilfull Artist pleases.

An Instance of this may be afforded us, by some *Legumen's*, as Pease, or Beanes; which if they be newly gathered and distilled in a Retort, 'twill I presume be easily granted, that they will like many other green vegetables afford, besides a great deal of Phlegme, an Acid Spirit, and if I much misremember not, I had such a spirit from either pease, or beanes, or both, after they had been kept long enough to loose their verdure: But if these seeds be at a fit time duely fermented with common water,

I thinke it will not be doubted, but that they, as well as other mealy seeds, will yeild an ardent spirit, but it will not so easily be suspected, much less beleev'd, that without adding any thing to them, or meddling with them, barely by keeping them in a dry place, for a certaine number of months, they will yeild a spirit that by one, that did not know whence it proceeded, would be judged near of kin to the spirit of *Urine*, or of *Harts-horne*, and to other saline liquors drawn from animall substances; for having distill'd these *Legumen's* by themselves, without any additament, and without so much as breaking them, they afforded me spirits, not only far more like in smell to those, I have compared them to, than they were either to *Acid*, or *Vinous* Spirits, but very like them, in more intimate qualities: since they would, as the Spirit of *Urine* and *Harts-horne*, make a conflict with *Acid* spirits, turne Syrope of Violets greene, dissolve Copper blew, precipitate a solution of sublimate into a white substance, and in a Word
performe

performe those things, which I many yeares ago delivered in the Tract about *Colours*, and severall ingenious writers have since embraced, as the distinguishing markes of *Volatile* and *Urinous* salts, or spirits. I say *salts* or *Spirits*, because I found that these drawn from Vegetables, as well as those afforded by Animalls, may easily by a dexterous sublimation be brought to exhibit many of their nobler parts in the forme of a dry salt, as well as in that of a spirituous liquor.

Another instance I shall take from the juice of grapes, though Chymists will perhaps thinke it strange, that I should undertake to accommodate it to my present purpose, but there is no great mystery in the business, for the fresh juice of grapes or must, though sweet in taste, will if it be timely distill'd to the Consistence almost of a Syrope, yeild a copious flegme, but not an ardent Spirit: if the superfluous moisture be skilfully evaporated, there will remaine a kind of *Rob* or *Sapa* of a pleasant tartness, which I have known used in some places, (as especially in, or neare

neare *Suizerland*,) for an excellent ingredient of sauces, and also, to be spread upon bread to be eaten instead of butter.

But if this *Raisinee* or *Sapa* were presently distilled, I suppose it would yeild no *Vinous*, but an *Acid Spirit*: I said, *I suppose*, because for want of Vineyards in *England*, I could not examine any liquor taken out of great Vessells of Must, and therefore cannot say precisely and experimentally, what distilled liquors it would afford; since I know not certainly whether the great quantity of the sweet liquor, and its continuance for some time (though not a long one) in the state of what they call *Must*, may not somewhat alter it's productions, but if, as it is probable, that diversity be not considerable, I may safely suppose, that the *Vinous* spirit afforded by the Juice of Grapes, after fermentation has turned it into Wine, is a produced thing, and was not in that forme preexistent in the Juice; for having purposely caused ripe grapes to be moderately press'd, that their Juice may without much dreggy matter

matter be Squeezed out, we put this liquor into a glass-head and body, and distilling it with a gentle fire, we obtained a scarce credible proportion of flegme: And then transferring the somewhat inspissated remainder into a Retort, after having kept some of it (which had a grateful mixture of sweetness and acidity) for *Raisinee*, we prosecuted the distillation with a stronger fire, and obtained not a *Vinous*, but an *Acid Spirit*, as we found not only by it's smell and taste, but by it's corroding fragments of Corall, even in the cold, by it's growing sweet upon *Minium*, &c. Agreeably to which experiment I found by tryall, that *Raisons*, which consist chiefly of the Juice of Grapes, inspissated in the skins or huskes by the avolition of the superfluous moisture through their pores, being distill'd in a Retort, did not afford any *Vinous*, But rather an *Acetous Spirit*, that, as an *Acid* liquor, would worke upon diverse bodies, as spirit of Vinegar would have done, and yet as it was formerly noted, 'tis known that *Raisons* being

ing in a due proportion fermented with common water will after a certaine time afford a *Vinous* and inebriating liquor; and though this time in the better sort of the knowne wayes, of making artificiall wines, is wont to amount to many months, yet I have practised a way (which consists chiefly in a determinate proportion of the water to the *Raisons*,) by the help of which the liquor in very few weekes becomes fit to drinke, and consequently to afford by distillation a *Vinous* spirit; but this only upon the by.

I shall now add, which probably you will thinke somewhat strange, that from the Juice of Grapes even after it has been duely fermented, there may be Obtained a distilled liquor, which having not found mentioned in Authors, I thought that I might take the liberty to name, and upon the account of it's taste, and some other qualities to call it the *Acid spirit of Wine*: to satisfy you therefore, that there is such a liquor, I will not make use of *Rhenish* wine or other wines, that are thought to
relish

relissi of Acidity; but I will acquaint you, with an Experiment that I chose to make upon Sack, as a Wine fully ripe, and more remote from an Acid and Tartarous nature, than those are wont to be, that are made in less hot Climates. We tooke then some good Sacke, and having a digestive Furnace, and in a glass-head and body slowly drawne off the Ardent spirit first, and then the Phlegm, (which even in this generous Wine was copious) till there remained a liquor of the consistence of a somewhat thin syrup; we removed it into a Retort, and distill'd it by degrees of fire, whereby we obtained, besides a sourish flegme that came first over, a true acid spirit, as appeared not only by the taste, but by the hissing noise and numerous bubbles that were produced; when we poured it upon a Lixivate salt; as also by this, that having put it upon powdered Coralls, it began briskely to dissolve them, even in the cold; we likewise made it corrode some metalline, and minerall bodies, of which 'tis not here necessary to give you an account, no more than

than of the black substance that remained after the distillation; only two things I will here intimate about them. The one, that as this Acid spirit of Wine has its origination differing from that of other known Acid spirits, and even from spirit of Vinegar, so I thought it not irrationall to conjecture, that it might have some peculiar qualities, whose discovery I leave you (if you think it worth the while) to prosecute: only by way of encouragement, as well as hint, I shall tell you, that having put some of it, for a certaine reason, upon filings of copper, in such manner that some of them, after being wetted with the spirit, should remaine expos'd to the Aire, and others lye beneath the liquor, I found though the tryalls were made in the cold, that in a day or two, the exposed filings had gained a fine blewish green colour, but the spirit that swam upon the other filings, did in few hours acquire a fine redness, which afterwards in two or three dayes degenerated into a colour, like that of the exposed filings. The other thing I will

will note, relates to the *Caput Mortuum* of the distilled Wine, which I found a more fixt body than one would have expected, and it is that though probably the finer part belonging as to other Vegetable mixts, so to the Juice of Grapes, being attenuated and subtilized was changed into an ardent spirit, and therefore appeared not in the distillation, in the forme of Oyle, yet 'tis not unlikely that the courser part of the oleaginous substance remained still in the *Caput Mortuum*: for holding it in the flame of a Candle, I observed that it would partly exhale in thick smoke, partly melt, and as it were fry, and and partly burn with an actual flame, which was not only continued while the flame of the Candle cherished it, but would after it was removed from the Candle, continue a pretty while to flame upon its own account, and a parcell of it, being cast upon quicke, (but not upon flaming) coales, burned with a blaze, almost as if it had been Amber, or Bitumen. I could here tell you, of fine *Chrystalls of Wine*, that I many
yeares

yeares since made by a peculiar way, of the above mentioned extract of Sacke, but this may be elsewhere more fully mentioned.

To returne therefore to our Juice of Grapes, we see that meerly by a seemingly slight difference in the management of it, it may be made to afford either a *Vinous*, or *Acid* spirit, and I shall now add, that it may also be brought to yield a *Volatile* or *Urinous* one; for 'tis known that in process of time, Wine affords *Tartar*, and though Chymists suppose the spirit of *Tartar* to be of a quite differing nature from that of *Urine* and of *Soot*, and though I have elsewhere shewn that *Tartar* distilled the common way affords a double spirit, namely an *Acid*, and another that I thought fit to call *Anonymous*, yet I elsewhere show that by a peculiar and slow way of operating, I have been able to obtaine (though perhaps not constantly) from crude *Tartar*, without any Additament, a spirituous substance, that in taste, smell, and divers manifest operations, much more resembled the *Volatile* spirit of *Urine*,

or rather that of *Soot*, obtained as mine of *Tartar* was, by meere distillation, than an *Acid Spirit*: with which (so little did they agree) it was disposed to make a conflict as soon as they were put together. But such a kind of *Volatile* substance may be far more easily obtained from the Lees of Wine, than from *Tartar*, for having been accidentally informed, that an expert Chymist in *Germany* had found the way to get store of *Volatile Salt* from lees of Wine, I resolved to try whither it might not be done without any addition, and having procured some of the best lees (I could get) of *Rhenish* Wine, I caused them to be exposed in broad Vessells to the Sun, and the free aire, (which circumstance yet I am not sure is necessary) that they might leisurely be dryed, if not also be impregnated in order to the *Volatility* of their saline parts. Then these dryed *feces* being carefully distilled in a Retort by degrees of fire, the liquor was slowly rectified, by which meanes there ascended before the Phlegm a spirituous

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part, which would turne Syrup of Violets greene, precipitate dissolved sublimite into a white powder, soon colour it selfe upon Copper with a deep blew, and in short do several things, by the performance of which we have elsewhere distinguished *Volatile Salts* and Spirits, from *Acid*, and from *Vinous* ones. By all such Tryalls upon the Juice of grapes, we may inferr the truth, we intended to prove by them, namely that the same matter as it is differingly managed, may be made to afford an *Acid* (besid s one that is truly *Acetous*) a *Vinous*, and a *Volatile* spirit: besides that, *ex abundanti* it may also be made to yeild, as I have noted in mentioning the distillation of *Tartar*, another sort of spirituous substance, as yet *Anonymous*.

New

*New observations about the Adiapho-
rous spirits of Woods and divers
other Bodies.*

AND now having said upon the mentioning of this sort of spirits that I have call'd *Anonymous*, since I Remember not that the notice I gave the Publique of them * has engaged any writer to examine them; I am content on this occasion to touch upon some of the more quicke and easy tryalls that I have made about this kind of Liquors, that I may both excite and somewhat assist the Curiosity of those enquirers, that shall attempt to make a farther discovery of the nature of these spirits, which when I first separated from the Acid spirits, where-with Chymists had before confounded them, as stiling them and taking them to be meerly the Acid spirits of *Tartar, Wood, &c.* their properties were so little known to me; that I contented my selfe to stile them *Anonymous spirits*: but since having found

** This was
done in the
Sceptical
Chymist*

them to differ in divers qualities, both from *Vinous*, from *Acid*, and from *Urinous* ones, and having not sufficiently discovered their positive properties; I was wont to give them a negative appellation, and call each of them the *Neutrall* or *Adiaphorous* spirit of the body that affords it (whether it be *Tartar*, *Wood*, or any other like concrete.)

But before I descend to particulars, it will not be improper to premise in generall, three or foure things not unfit to make way for the observations that are to follow them.

1. I know not whether it will be requisite to repeat in the first place, that our *Adiaphorous* spirit may be obtain'd by distilling the Liquor that is afforded by Woods and divers other bodies, by *Distilling this Liquor* I say from Coralls, or calcin'd Lead, for by this meanes the Acid corpuseles of the *Menstruum* will worke upon the Corall or the Lead, and so fasten themselves to what they corrode, that they will easily enough part with the *Adiaphorous Spirits*, which by this meanes are permitted to ascend by them-

themselves and fall into the Receiver, in the forme of a liquor. This, as I was saying, I know not whether it be necessary to insist on in this place, because I have already mentioned it in another paper: but I think it may be very pertinent to relate here, that I endeavoured to try whether there was not a difference in gravity or fixedness between the *Acid* and *Neutrall* spirit of Wood, without mortifying the first, and whether by the help of this gravity and fixedness I might not be able to separate, at least in great part, the *Acid* from the other, and so preserve it in its distinct nature.

In order to this, I caused a pretty quantity of the rectified spirit of *Box* to be slowly distill'd in a glass Body and Head plac'd in a sand cappel with the flame of a Lamp, as that which would give a more gentle and regular heat than Charcoal, as indeed in the first 24 houres or thereabouts this furnace afforded but about two spoonfulls of liquor, and though the *Mensuraum* first put in scarce exceeded by our guess one pint or pound (if it were so much) yet it was divers dayes

and nights in drawing over. And in this operation the next observable circumstances were these two. 1. that the liquor that first ascended was not Phlegme, but had a very penetrant taste, yet without any manifest Acidity, discoverable by the tongue, though by putting it upon fine powder of Corall (whether crude or calcin'd I remember not) yet had some operation that made mee think it not altogether devoid of Acid particles. Secondly having often shifted the Receiver, the better to judge whether the portions of the ascending spirit were considerably different in quantity, I found that towards the latter end the liquor that came over was sharper than before, and having at length distill'd all I could make to arise, we found the last parcell of liquor (which was copious enough) to be of a good yellow colour, (though those that preceded it were limpid enough) and both to smell strong of Vinegar, and to taste more acid upon the tongue than spirit of common Vinegar it selfe: so that if I had not known how it was obtain'd, I had suspected

suspected it to be what the Chymists call *Acetum radicum*, and accordingly I found it to be a very active *Mensuum* in the dissolution of some body's that for tryalls sake were put into it. All which seems to argue, that the Acid portion of such distill'd liquors as I have been speaking of, is more ponderous, or more fixt than the *Adiaphorous* spirit which upon this account may be in great part separated from it, by bare distillation, if it be warily enough made.

My second generall remarke shall be, that I have observ'd these *Neutrall Spirits* to be not all of them in all things of the same nature, since though they agree in some generall attributes, which suffice to entitle them to the same species or denomination; yet they sometimes differ from one another in particular qualities: which advertisement I thought it necessary to premise, that it may not seem strange, and that I may not be blamed, though some of the tryalls I shall set downe do not punctually succeed in their hands, that shall not make use of the *Anonymous* spirit of *Box*, which I employ'd;

not because I think it better than any other, but because amongst divers that I have made use of, I had then a greater quantity of it at hand. But though for this reason, when I shall speak what I have observ'd in an *Adiaphorous* spirit, without naming it, I would be understood of the spirit of *Box*, which I had freed from its Acid mixture by distilling it from calcin'd Corall, yet I shall not so confine my selfe to this, as not to mention now and then, some other spirit of the same family.

The third generall observation that I shall make about our *Adiaphorous* spirits, is, that though the few Chymists that have taken any notice of the distilled liquors, for example, of *Woods*, were wont by reason of their Acid tastes to looke upon them, as of a meerly Acetous nature, and having accordingly call'd them the *Vinegars* or *Acetous* spirits of *Wood*, yet really the Acid portion of these distill'd liquors, is far from being the greatest: for besides what other tryals I have purposely made, I remember I took eight ounces of the rectified spirit

spirit of Box, wherein the Acetous and neutrall spirit remain'd confounded, as they had been in the first distillation, and having poured this upon a quantity of Calcin'd Corall, sufficient to satiate the Acid Corpuscles, (which quickly fell to corrode it with noise and bubbles) we gently distill'd it to a dryness in a glass head and body, by which meanes we obtained of *Adiaphorous* spirit, but eight grains less than seven ounces and an halfe, and some of the *Menstruum* having been wasted in the operation, the Acid corpuscles remaining in the bottom with the Corall they had corroded, weighed but between two and three drachmes; which shews, that notwithstanding the not contemptible quantity of strong spirit of Vinegar, that by our lately recited observation the distilled liquor of Box do's containe, the Corpuscles that make it so Acid being concentred, take up but a little roome. And since it was rationall to suspect that the Acetous Corpuscles being made without fermentation, might have something peculiar in their nature, I caus'd them

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to be gradually distill'd with a stronge fire from the Corall, and thereby obtained a very red spirit, of which, though many Chymists would take it for a *Volatile* tincture of Coral, I shall only observe, that its smell was very stronge, and its taste exceeding penetrant, but very differing from that of *Acid liquors*.

Whether our *Adiaphorous* spirit may (as I sometimes suspected it may) be generated, by a commixture of the finer parts of the oyl of the wood reduc'd to an extraordinary smallness, and thereby capable of being exquisitely mixt with the Phlegme, and strictly associated with it's particles, I shall stay till I be better furnished with experiments, before I venter to determine.

Having premis'd the foregoing generall observations, I shall proceed to particular ones, as soon as I shall have advertis'd you, that for the better discerning the *Phænomena* to be produc'd, I chose to make almost all the following tryalls in Cylindricall glasses of about an inch in Diameter.

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To the *Phenomenon* I am about to take notice of, I therefore give the first place, amongst those produc'd by the help of our *Adiaphorous* spirit, because 'tis uncommon and not unpleasant: for though we have many Experiments of the suddain *transmutation* of colours, whereby we change one into another, yet we have very few of the production of colours *De Novo*, in body's that were colourless before. And I remember not, that the writers I have since met with, have added any Experiments of this kind, to those three or foure that I have mentioned in the *History of Colours*.

I. I shall begin then with observing, that having into our *Adiaphorous* Spirit of Box dropt a convenient quantity of stronge and transparent oyle of *Vitriol*, and shaken the liquor together, there presently emerg'd a rich and lovely red colour, which at first was *Diaphanous*, but afterwards grew so deep, that it was opacous, though by shaking the glass, the thin liquor that would slowly glide downe the inside of the glass, being

being held against the light, manifested, that the colour was still red, though much more darke and muscadine-like than before.

2. Some common *Aqua fortis* being put to our neutrall spirit and shaken a little with it, presently gave it a rich Amber or high yellow colour, but not a true red: but if the liquors were not mingled by Agitation, the spirit did but slowly and gradually obtaine the above mentioned colour, which was somewhat deeper than that of Sacke; after this change the liquor continued transparent, and (which is a circumstance not to be omitted) the change at first was wrought without any manifest precipitation, though afterwards, when the mixture had rested a good while, there appeared some little and light feculency at the bottom of the glass, and the inside of it, as far as the liquor reached, was fullyed with a cloudiness not easy to be washed off. One circumstance more of this tryall I must not omit, which is, that notwithstanding the strong and offensive smell that is wont to be justly complained

plained of in *Aqua fortis*, in our mixture it was either none or but very faint, being conceal'd (if I may so speake) or suppressed, and partly perhaps disguis'd by the predominant odour of the *Adiaphorons* spirit.

3. Some spirit of *Salt* being mingled with our spirit of *Box*, the mixture became much less *Diaphanous* than the liquors had been before their conjunction, and for a day or two was only whitish, but when we removed it into a digestive furnace, and kept it there for many houres, it acquired a colour high enough, partaking of browne and yellow, and appeared to have let fall some little sediment to the bottom of the glass.

4. Having put some of our *Adiaphorons* liquor on salt of *Tartar* it had not any sensible operation on it that we tooke notice of, save that it dissolved the salt, and after some digestion appeared of a yellow colour tending to browne, and fastned to the inside of the Phiall in many little graines of Salt, that seem'd to have been first dissolved and then coagulated

ted againe in newly emergent figures.

5. Our *Adiaphorous* liquor being confounded with high rectified spirit of *Wine*, neither of them appeared to change colour much (for some change there was towards yellowness) or be opacated by their conjunction, even after some dayes digesting; but the *Vinous Spirit* did not hinder the other from being turned red by the action of some potent *Acid*, when it was poured on the mixture.

6. Rectified spirit of *Urine* being put to our *Adiaphorous* liquor did not make any conflict with it, but joined with it quietly, as the above mentioned spirits had done, and did not manifestly change the colour of either of the liquors, whiles they were kept many hours in the cold, but being transfer'd into a digestive furnace and kept there a night or two, the liquor acquired a high colour, which was almost Orange-browne, and there appeared some little *faces* at the bottom. Having made these tryalls upon our spirit with simple liquors,

liquors, I thought fit to make some with such compounded liquors, as the solution of Metalls are, to see if our spirit, though neither manifestly of an *Acid*, or an *Urinous*, or a *Lixivate* nature, would procure precipitations of any part of the dissolv'd Metalls.

7. In prosecuting this enquiry I dropt into some of our spirit, a little solution of refin'd Gold, which at first imparted there to it's own colour (perhaps somewhat hightned) but the mixture quickly lost it's transparency and grew muddy, and after a while let fall a considerable quantity of sediment or Precipitate; the supernatant liquor having acquir'd a brownish colour.

8. Having mixt our spirit with a good solution of crude *Lead*, made with an appropriated *Mensstruum* that dissolves it readily and cleare, almost as *Aqua fortis* does common *Silver*, the mixture presently grew muddy, and at length after some dayes let fall a copious sediment, over which swam a liquor between brown and red.

9. We

9. We put to our spirit of Box some fine ceruleous tincture or solution of Copper, made with an Urinous spirit, (as of putrified Urine or Sal Armoniack) and soon perceived the mixture to grow troubled; which afforded us, though but very slowly, a copious residence.

10. We mingled with our spirit a convenient quantity of strong infusion of *Sublimate* made in faire water, but found not any manifest reaction betweene those liquors, no more than we did between dry and undissolved *Sublimate* and the same spirit, when we kept them together in this same Phial.

11. Mixing our spirit with oyle of *Tartar per deliquium* there did not suddenly appeare any manifest change, but having digested the mixture for severall dayes, there precipitated a light feculency, and the supernatant liquor, which was transparent, appeared of a colour inclinable to red.

12. We also mingled with some of our spirit a convenient quantity of *Vitriol of Copper* dissolved in faire water, till the liquor seem'd satiated with
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the Vitriol, but I remember not that in some dayes, the solution grew manifestly opacous or discoloured.

13. We put to our spirit a solution of *Tin*, made in a *Menstruum* that dissolves it cleare, and found very little alteration to ensue, though we left the liquors many houres together.

14. But when I put to our spirit a convenient quantity of the solution of *Mercury*, made in *Aqua fortis*, the colour of the mixture became first deeply yellow, and in a minute or two intensely red, and being digested for some dayes, I found at the bottom of the Phial a white Precipitate, much more copious than I expected, and the transparent liquor, that swam above it, was of a rich golden colour; whether Physitians or Surgeons should thinke fit to employ this Precipitate, or this tinged liquor for Medicinall purposes, I shall leave them to consider.

15. Severall of the foregoing Experiments were tryed with the spirits of other Woods than *Box*, and in particular with those of *Oake* and *Guajacum*, the *Prænomena* of which Experiments

riments were not alwaies the same with those above recited, which may probably argue some difference in the nature of such spirits, as well as there is in the constitution of the Woods that afforded them; nor for certaine reasons have I thought fit to recount here all the tryalls I have made with the *Adiaphorous* spirit of *Box* it selfe, of which sort I shall for example sake name only two, which I remember as having been the latest I made, whereof the *first* was, That having put some of our neutrall spirit upon some pieces of fine red *Corall*, and kept them there many dayes, the liquor did not appeare to have extracted any tincture from them, though the upper part of the highest fragments seem'd to be turn'd white. And the *other* was, That having taken a parcell of spirit that came over by rectification in a Lamp furnace long before the more fixt *Acetous* spirit came to ascend, and having purposely expos'd a Phiall scarce halfe full of it, in a very sharpe frosty night in a Garden covered with Snow and Ice, it was taken up the next morning

ning, not at all frozen, but less
limpid than before, and this little
opacity did (somewhat to our wonder)
remaine more or less for some weekes
after.

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The



The third Part.

About the Producibleness of Sulphurs.

THose substances, that Chymists are wont to call the *Sulphurs* of the mixt bodies, that by the help of the fire are brought to afford them, are not of so uniforme a Nature as might be expected in the portions of the same Principle. For as on the one side Chymists make *inflammability* to be the constituent Character of *Sulphur*, so on the other side, 'tis obvious enough to those that are any thing vers'd in *Spagiricall* operations, that there are at least three substances manifestly differing in Consistence, Texture, or both, that, according to the notion lately assign'd

assign'd, ought to be referr'd to *Sulphur*. For *sometimes* the Inflammable substance, that is obtain'd from a mixt body by the Intervention of the Fire, appears in the forme of an oyle, that will not mingle with water; *sometimes* in the forme of an ardent spirit, that will readily unite with that liquor; and *sometimes* also in the forme of a Consistent body, almost like common *Sulphur*.

Notwithstanding these various formes, in which it appeares 'tis not impossible but that in *many* mixt bodies, not to say in *all*, what is called *Sulphur* may be no Primordiall Ingredient, but rather a Generated or Resulting thing. For that which is common to these differing bodies, that pass under the name of *Sulphurs*, and which is the constituent quality (if I may so call it) that discriminates them from the other materiall Principles of mixt bodies, must be confess'd, if we will speake intelligibly, to be *Inflammability*, or if you please, a *disposition to be turned into Fire*, and usually also into flame. Which being premis'd, I con-

sider here, that *Sulphur* it selfe is made of the same Universall matter, whereof other Bodies consist, and is but a Coalition of certaine particles thereof, whose Aggregate, by having such a Contexture, Motion, &c. acquires those properties, for which a Body is called *Sulphur*. And therefore if the like contexture happen to be found in other Portions of matter, or (to express my selfe more fully) if Art, or chance can frame and bring together Particles of matter, and give them such a Contexture as is apt and sufficient to dispose them to be kindled and flame or burn away; These Qualifications of such an Aggregate of Corpuscles will suffice to conferr on it the nature of a *Sulphur*, whether this portion of Matter do, or do not consist, or copiously participate, of the Chymists Primevall *Sulphur*. For it is not by vertue of the long preceeding Duration of a thing, but by that of the Essential Qualities belonging to it, that a Body deserves this, or that Denomination. As the *Snow* that fell yesterday, and
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was generated in a trice, is as true *Snow*, as that which has laine, perhaps for many years, on those *Alpes* that are alwayes cover'd with *Snow*, or on the highest Mountaines of the frigid zone. And in the Judgment of the Chymists themselves, a Pound of *Quick-Silver* recently transmuted by a graine or two of their *Elixir* into Gold, becomes as true Gold, as that which was coevall with the Mountaines, where nature has form'd the Ancientest Mines of that Metall.

The I. SECTION.*Of the Production of Oyles.*

That 'tis not necessary, the Oyles or Sulphurs obtain'd by the Fire from mixt bodies, should be a Primævall Element or Principle, may be probably argued from the Experiment mention'd in the *Scepticall Chymist* about the Growth of Plants nourish'd by meer water, which nevertheless by Distillation afforded an oyle. And we see that in Almond trees, walnut trees, and divers others, the raine water, that insinuates it selfe into their roots, is by successive changes of Texture reduc'd into the Oyle which the Fruit by expression so plentifully affords. And to confirme our Experiment from the growth of Plants by transmuted or assimilated water, to obviate the suspition of common waters being impregnated with the grosser Juices of the Earth, I employ'd distill'd water. About which

which Experiment I find this short memoriall among my *Adversaria*.

[A Sprigg of Mint put into Raine water distill'd, and fed almost wholly with redistill'd Raine water weighed July 15. gr. 3. and was taken out August the 14. and being well dried with Paper and a Cloath, weighed 10. graines and about a Quarter: So that within less than a Month it grew to be three times as heavy, as when 'twas first put in. Another put in, and taken out at the same time, with the former, had attained within less than a Month to near four times it's first weight, and had shoot out a second sprigg much higher than the first, and store of Roots, some of them near as long againe, as the whole plant when it was first put in]

If we consider what a great quantity of Oyle is afforded by an Olive-yard, whose Trees are probably, as well as those that beare Apples, Cherries, and other kinds of Aqueous fruits, nourished chiefly by Raine water; that being imbibed by the Roots is by various digestions, or preparatory changes, turn'd in-
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to Oyl in the Olive, it will not appear unlikely, that Oyle may be produced of other substances; since in our instance it seems to have been made by transmutation of water, though this be generally reputed to be of all Liquors the most contrary to it, and is evidently of a nature exceeding distant from it.

X And here I shall relate an Experiment, by which I attempted to produce it, out of only two distill'd liquors, that according to the common estimation of Chymists are uncompounded Bodies, and whether they be really so or not, are each of them readily dissolvable in water, and in one another. Take then of Oyle of Vitriol, and of such spirit of Wine as is totally inflammable, an equall weight, mix them together by degrees, lest the heat they will produce should breed some inconvenience, and having digested them a good while (which yet is not absolutely necessary) with a very wary management of the fire (for else the Experiment will easily miscarry) draw off what will come over,

over, and if you goe to worke, as I have severall times done, you shall obtaine besides a subtile and odori-ferous spirit of Wine and an *Acid* sulphureous Liquor, a considerable quantity of Chymicall Oyle, which I have had sometimes deeply colour'd, sometimes clear like faire water, and this Oyl you will perchance looke on as an odd liquor, when I tell you that I have had it, sometimes exceeding fragrant, and (though the oyl of Vitriol be so highly Corro-sive) without any Acidity at all, the Taste of it being very subtile and penetrant, but no way like that of any saline liquor, that we know. This hath sometimes inticed me to doubt, whether it hath been made of the spirit of Wine, or of the oyl of Vitriol. The Circumstances last mentioned seem to perswade the former; especially if I add to them, that I found by Tryall purposely made that this oyle would readily mix with good spirit of Wine that had never had to do with oyle of Vitriol, but on the other side it seem'd considerable, that the
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oyle of *Vitriol* by this operation was much weakened and changed, and it appear'd not, whence the spirit of Wine should have so great a fragrancy, which considerations were back't by this more weighty Argument, that this Oyle was so ponderous as to sinke not only in common water, which is yet a far more heavy liquor than pure spirit of Wine, but in the *Acid* spirit it selfe, which seem'd to be the remains of the alter'd oyle of *Vitriol*, which, by reason of it's abounding in Salt, you will easily grant to be far heavier than Common water. But I need not much trouble my selfe, to determine, which 'tis of the two liquors, that affords this stronge oyle; for it may well be (though not equally) composed of both, by their mutuall Action, and the operation of the Fire, united in the forme of Oyle. And if it be objected as probably it will, that this inflammable substance is made but by extrication of the parts, that lay conceal'd in the liquors before they were brought together, it may be answered, that this

this should not be supposed, but proved, which till it be our cause will be favour'd by our Experiment, wherein there appears nothing so likely as a Change of Texture; to which may be ascribed the Production of our *Anomalous* Chymical Oyle, since this plainly seems to result from two bodies whereof neither was a true oyle before. For each of them would readily mingle with water, whereas this produc'd oyle of our's, being shaken with water, would breake like common oyles, into numerous little globul's; which would presently after sinke to the bottom and reunite there into a liquor, which for Tryall sake I have kept diverse weekes in the water, and found it at last undissolved by it. Some odd properties of this oyl make it seem likely to participate of some of the nobler parts of *Vitriol*, and the sulphur of that Metall having extraordinary virtues ascribed to it, by some of the famousst and Intelligentest Spagirists, (as *Easilius* *Valentinus* *Helmont* &c.) I kept some quantity of this oyle by me for severall yeares, to observe,

as I did with pleasure, the alterations that time would produce in it, and afterwards I imparted either some of the Medicine it selfe, (whereof the first Tryal proved very successfull) or the wayes of preparing it, or both, to some ingenious Men, who (I am told) did not all of them remember me in the free mention they made of it.

But this concernes not our Argument, upon occasion whereof I shall observe upon the by, that though Chymists should be able to prove that our Oyl was but seperated from the spirit of Wine, or the oyl of *Vi-triol*, in which it was latent before, yet still the Experiment would afford me a considerable reason for questioning a maine point in the doctrine of the vulgar Chymists, who confidently pretend to prove from the number of similar substances (as they suppose them) obtain'd from a mixt body, that it was actually compounded of just so many distinct and true material Principles and such a quantity of each. For if from a distill'd Liquor, as the
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oyle or rather ponderous and *Acid* spirit of *Vitriol*, or from *Alcohol of Wine*, which is commonly reputed to be uncompoundd, a liquor of quite another kind may be (not *made* but) *separated*, how little reason have we, to take it for granted with the Chymists, that every distill'd liquor, that they looke upon as one of the Component Principles of the Body that afforded it, is a *Homogeneous* substance not further divisible into differing parts.

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The II. SECTION.

Of the Production of inflammable Spirits.

AFTER what has been hitherto delivered concerning the production of Oyles, I should now proceed to that of another sort of liquors, referr'd by the Chymists, to the principle they call *Sulphur*; though better known to others, by the Name of *inflammable Spirits*. But of these I shall purposely forbear to discourse in this place and rather refer to what I have said to them in another, where I thought it more proper to consider them; Namely, in one of the Sections of that part of these Notes, that treats of the producibleness of *Vinous Spirits*.

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The III. SECTION.

Of the Production of Consistent Sulphurs.

I F you should here tell me, as perhaps you will do, that what I have been hitherto saying relates but to Inflammable liquors, whereas *Sulphur*, in it's most proper and primary Acceptation, Signify's a Minerall Body; I shall answer, that, as I formerly intimated, the Chymists use the terme *Sulphur* so ambiguously, and so uncertainly, that they have made it difficult for other Men's discourses to avoid all appearance of participating of the Confusedness, they seem to have affected in theirs. But because the most intelligible, and least indefinite Notion their writings suggest of *Sulphur*, is, that 'tis a Combustible and Inflammable Principle; I have hitherto treated of it as such. And as for that *Sulphur*, that is commonly known by that name, and bought in shops, though I know there are some

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Chymists

Chymists that have affirm'd, that from Vegetables and Animalls they can separate such a *Sulphur*; yet since they are not wont to teach us the way of doing it, nor give us any proofs besides there own word, of there having ever done it themselves, the thing has seem'd so improbable, that I find few or none of the more Judicious of their own Party, that looke upon it, as other, than a Bragg: only a follower of *Glauber*, I find to have undertaken, by his Master's directions, to produce a real *Sulphur*, like the Minerall, out of Vegetable Charcoal, by a way, which, because it has deceived more than him, and is specious enough to impose upon those that either are not Chymists, or, if they be Chymists, are not cautious Men, I shall here set down, and examine, as after the Author I made it.

We tooke then equall quantities (suppose a pound of each) of good oyl of *Vitriol* and of common sea-salt, dissolyed in as much water as was requisite: This mixture was slowly distill'd, till the bottome was thoroughly

thoroughly dry, (which it will not be so soon as it begins to look white, or appeare coagulated) then setting aside the Liquor, (whereof the first part that came over was Phlegm, and the other part spirit of Salt) we tooke out the *Caput Mortuum*, (which if one pleases, may be purified by being dissolv'd and philter'd) and having beat it to powder with about $\frac{1}{4}$ or $\frac{1}{3}$ part of its weight of Charcoal, we put it in a strong Crucible, and kept the mixture melted in a Vehement fire, till it grew of a darke reddish colour, for by that time such a change was made in the Mass, that it both smelt and tasted rankly enough of Sulphur; and if spirit of *Sal Armoniack* were seasonably distill'd from it, with a competent, but not over hasty fire, the ascending spirit would be manifestly impregnated with *Sulphur* not difficultly separable, which may also be divers other wayes obtain'd from the same fixt *Caput Mortuum*.

But for all this specious operation, I do not take the *Sulphur*, thus produc'd, to have been the Vegetable

Sulphur of Charcoal, but a Minerall Sulphur that lay conceal'd in a liquid forme among the saline parts of the Oyle of Vitriol.

For, *First*, 'tis not likely that so small a quantity of Charcoal, as was employed in this Experiment, and much less that so small a quantity as *may suffice* to make it, could containe so much Sulphur as may this way be obtained.

Next, that common *Vitriol* is not destitute of Minerall Sulphur, may be easily conjectur'd by the Sulphureousness of the Marchasites whereof 'tis wont to be made. In so much that in divers Countreys, as about *Liege*, and in some parts of *Italy*, from the same substance that affords them Vitriol, they obtaine by sublimation great quantities of common Sulphur, which is sold for such into divers other Countreys. And I have found by Tryall, and do not at all thinke my selfe in that singular, that one may obtaine from Vitriol an oyle, and a *Caput Mortuum*, which being put together afforded a smell of common Sulphur so strong, that I
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was scarce able to indure it.

And to come yet more close to our Experiment I have (as I have elsewhere mentioned) purposely tryed, more than once or twice, that by distilling together common oyl of *Turpentine* and common oyle of *Vitriol*, the former of those liquors, would make a separation of some of the Sulphur that lay conceal'd in the latter, and as it were extricate and extract it: so that besides an exceedingly Sulphureous liquor, which sometimes was made white by the copiously dissolved (and partly precipitated) Sulphur, that pass'd into the Receiver; we had in the Necke of the Retort a yellowish consistent body, which being put upon a quicke Coal, would, after a little yellow flame (probably proceeding from some adhering parts of *Turpentine*) afford good store of Blewish flame, like that of common *Sulphur*, which it also emulated in it's smell. And such a kind of *Sulphur* I have also seen, in tract of time, settle it selfe, in no inconsiderable quantity, at the bottom of the Liquor, distill'd from the mixture of the two

above mention'd Oyles. Nor are these the only wayes, by which I have obtained from oyle of *Vitriol* manifest proofes of it's containing a *minerall Sulphur* very like to common *Sulphur*.

And in particular it now comes into my mind, that I once put into a Retort, together with one part of *running Mercury*, four parts of oyle of *Vitriol*, and having distill'd off the *Mensuum*, by degrees of fire, there remain'd at the bottome of the Glasse a very white powder. This *Calx*, being afterwards gradually prest with a stronger fire, afforded in the upper part of the Retort a great many small bodies, that look'd like halfe Beades of Amber, and seem'd to be of very fine *Sulphur*, (but were afterwards confounded with many other ascending corpuscles.) This Amber-like Body (which was somewhat copious and as to some portions of it whitish) by its readiness to be melted, by its smell and by the blewish flame it afforded when it burned, appeared to be a kind of *Sulphur*, which you will easily grant, to be

be far more unlikely to have proceeded from so Homogeneous a body, as the *Quicksilver*, than from the Oyle of *Vitriol*, which we have already shown to consist of divers Sulphureous as well as many Acid corpuscles. And on this occasion I remember, that, whereas upon mingling the oyles of *Turpentine* and of *Vitriol* in a due proportion, I have constantly observed, that they incorporated into a mixture, that was deeply red, (and this may easily be tryed by letting fall two or three drops of oyle of *Vitriol* upon some drops of that of *Turpentine*, and mixing them in a concave Vessell, or even in a hollowed piece of paper) whereas, I say, I observ'd this, I was thereby induc'd to suspect the *Chymicall* (for I say not, the *Opticall*) cause of that *Phænomenon* might be, that the *Terebinthinate* Oyle had made a solution of divers sulphureous Particles it met with, in the oyle of *Vitriol*, and by that meanes acquired such a redness, as we see that common flower of *Sulphur* gives to the oyle of *Turpentine*, when 'tis dissolv'd

in it. And to examine this conjecture, I found that divers other Chymicall oyles, and oyle of *Aniseeds* it selfe, as remote as 'tis from redness, would presently acquire that colour, being carefully incorporated with a due quantity of oyle of *Vitriol*. But this conjecture is propos'd only upon the by.

As for the *Sulphur* of Mineralls and Metalls, I confess, I have not yett found enough, either in Chymists Bookes, or in my own Experience, to make me willing to speake Dogmatically about them. And this the rather, because first, as to the *Sulphurs* that are sometimes obtainable from some of the Mineralls, I thinke it may be doubted, whether they belong'd to those Mineralls as Essential Ingredients, or were only Corpuscles of Common *Sulphur*, perhaps a little alter'd, that were mingled in the bowells of the Earth, with other parts that are essential to the nature of the Minerall. As we see, that in native *Cinnabar* the Mercury, which according to Chymists is a compleat Metall by it selfe,

is so mix'd with another body, as not to be distinctly discernable till it be separated by the fire. And this *Gannabar* affords me an instance, the more fit for my present purpose, because I have sometimes by an easy way obtain'd a Sulphur also from it: and since we have lately noted, that the Vitriolate *Marchasites* afford great store of common Sulphur, by a gross way of separation, it should not seem irrationall to suspect, that some common *Sulphur* may remaine more closely mixt with the saline and metalline parts of the Vitriol afforded by the same *Marchasites*; from which Latent corpuscles of *Sulphur* may in part proceed, the sulphureous smell, and other like things that we have lately taken notice of in Vitriol, and it's oyle. And perhaps by the same consideration one may account for the sulphureous qualities that are sometimes to be met with in the Liquors that pass for the Vinegars of Minerall Bodies, and particularly *Antimony*; to which may now and then be added some metalline Oar's: since I remember, I have had such a sulphureous Li-
quor

quor from good lead-*oar*, that I had ordered to be purposely digg'd out of the Mine at *Minedeep*, and being put in close Vessells speedily convey'd to me. And that nature her selfe may blend an imperfect minerall with Lead, I have had occasion to observe by an *oar*, whereof the owner found a Mine, but not being able to discover what it was, desir'd me to enforme him. For this gave me occasion to consider the *Oar* (whereof I have yet a Lump by me) and to observe, that 'twas so differing from the other *oar's* of that Country, that I did but diffidently guess, that 'twas a mixture that Nature had made of *Lead* and *Antimony*, till particular Tryalls had justified my suspitions.

But this is not all I had to say about the *Sulphurs* of Fossiles: For though I know that Chymists pretend to teach us wayes of Extracting the true *Sulphurs* of Mineralls, and Metalls; and Experience assures me, that a reall combustible *Sulphur* may be in a pretty quantity obtain'd from *Antimony*; yet there are two scruples that suffer me not fully to acquiesce in
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what they teach. The *first* is this, That Chymists oftentimes deceive others and themselves too, by mistaking those things for the true *Sulphurs* of Minerals, and Metalls, that really are not so: Of which I shall give a plaine instance in the preparation that many Spagirists deliver of the *Sulphur* of *Antimony*:

For when they have boil'd that Minerall in a strong *Lixivium* of Potashes, they suppose, that, as by the same operation, common *Sulphur* is dissolved, so the *Menstruum* seeks out, and takes up, only the Sulphurous Parts of the *Antimony*: And as common *Sulphur* is precipitated out of the *Lixivium*, wherein 'tis dissolv'd, by sprinkling on it Vinegar, or some other *Acid*, so they presume, that what is stricke down the same way from the solution of *Antimony*, made in the same *Menstruum*, must be the true *Sulphur* of that Minerall; in which they are confirm'd by the colour: And yet in reality, not only the *Sulphur* (supposing that there is one) but the other parts of the *Antimony* will be dissolved by a strong

strong *Lixivium*, and the yellow powder, that is precipitated, is but a kind of *Crocus*, which will sometimes after a while (at least in part) subside of it selfe, without the help of an Acid. Nor do's it convince me, that such a Body obtain'd from a Minerrall, or Metall, is its true Sulphur that it may be made to burne; for unless the colour and smell of the flame concurr, I shall be prone to suspect, that the inflammability may be apt to rise, partly from the great comminution made of the prepared Body, and partly from the additament employed in preparing it. For these two, and perhaps even one of them, may contribute so much to the inflammable disposition of a body, that little, or no true Sulphur will be necessary to make it burne. Of this I elsewhere give an instance in plates of Copper; from which an equall weight of sublimate has been distill'd. For the remaining Mass will melt and burne at the flame of a Candle, almost as readily as sealing Wax. And of these Instances I mention more in another paper, where I endeavour
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to shew, that combustible and inflammable bodies may be made up of Parts or Ingredients, that singly had not such Qualities. And yet the contrary of this is supposed in the Chymicall argument that inferrs from these Qualities, the presence of *Sulphur* in all those Minerall preparations, wherein they are found. Yet by this discourse I would not be thought to derogate, from the Medicall virtues, or other Utilities of such supposed *Sulphurs*. For they may be very usefull Concretes, though they be not true Principles; the finer parts of the Minerall being in some of these preparations extracted, and further divided, and perhaps very luckily associated with the finer parts of the Body, employ'd to act on them. By which meanes there may emerge new Concretes of great vertue and use. And therefore I intend not to derogate from those Metalline *Sulphurs*, which some Few Masters of Chymicall *Arca-na* reserve with great care among the chiefest they are proud of. And that you may the better examine

Of the
Produci-
bleness of
Inflammaz-
bility.

examine these fine *Crocus's*, as I am apt to thinke most of them, and try both what they are, and what they do; if I can light on the Proceſſe, (for I dare not trust my Memory) I will at the end of this *Appendix*, impart to you a way of preparing some of those that are made of Metalls, those being accounted the most difficult as well as noble. And thus much I now remember of the Tryalls I made according to this way; That I employ'd not any *Acid Menstruum*, or liquor made of any particular salt; but a *Neutral* or compounded salt; which whiles it was in actual fusion, would dissolve or corrode the very thinly laminated Metall.

I do not looke upon these substances as the true *Sulphurs* of the Metalls that afford them, but rather (as I lately intimated) suspect them to be a sort of fine *Crocus's*, and perhaps *Magistery's*; which by reason of the subtilty and sometimes Fixt-ness of their parts, may prove usefull to considerable purposes both in *Alchymy* and *Physick*.

But there is another sort of Body's
obtain'd

obtain'd from some Mineralls, and perhaps from Metalls too, that has a greater resemblance to Minerall *Sulphur*, than the newly mention'd *Crocus's* have.

To this purpose I remember that by putting *Aqua fortis* in a certain proportion upon Crude *Antimony*, and after it was almost totally distilled off, increasing the fire till a dry substance began to sublime, we had in the upper part of the Retort a yellow and brittle substance, which being carefully separated from the dark coloured Antimoniall powder, that was also elevated by the force of the fire, appear'd not only by its own colour, but that of its flame, and some other signes, to be much of the nature of common *Sulphur*: nor is this the only way whereby we have obtained such a substance from Crude *Antimony*, from which (if I much misremember not) I have had a yellow and combustible *Sulphur* even without the help of a *Menstruum*.

Paracelsus pretends to have a way of drawing *Sulphurs* from all Metals; of which process because I have found
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little or no notice taken by Chymists, I shall for the oddness of it, and the reputation of the Authour (whom I looke upon as a Man of great Experience in Metalline affaires) subjoyn it, as I find it among some of his loose papers or fragments.

Sulphur Metallorum

Theophrasti

Sulphur Metallorum est oleitas ex ipsis extracta, prædita virtutibus pro hominis salute. Sulphur aliud ex Metallis antequam ignem sunt passa elicetur; ut ex Marchasitis aureis, aut argenteis, &c. secundum nobilitatem mineræ; etiam nobile & præstans: & paucis interjectis, (Extractio Sulphuris ex mineris Metallicis) Etiam fieri potest per lixivium acre & deputatissimum: sed (vel potius illa) alia sulphura pro intrinseco corporis usu minus sunt commoda propter alkali cinerum, ex quo clavellatum conficimus erodens, & propter calcem ex quibus talia sunt lixivia. Sulphur sic extractum potest

test abluī aqua dulci, & præcipitari. Digestio duplum requirit temporis. Debet & rectificari lixivium per ipsius sublimationem ab omni residentia terrestri, ne cum ipso incorporentur talia Sulphura, & fiant corrosiva ad perniciem ægrotorum: quod ne fiat d'c'ta debet fieri separatio. Tantum de crudis.)

Sed jam fuis & depuratis elicias ipsorum Sulphur: certa nobilior meliorque via non dabitur, quam per aquam salis seu oleum ipsius præparatum, eo modo quem in Alchymia luculenter descripsi. Talis quippe aqua fundaliter & radicitus extrahit omnibus corporibus Metallicis liquorem ipsorum Naturalem, seu Sulphur & crocum præstantissimum tam pro operibus Medicis, quam pro Chymicis. Resolvit & frangit unumquodlibet Metallum, ex Natura ipsius Metallica deducens in aliam, pro varia intentione & industria laborantis.

Thus far Paracelsus's process; but as I know not whether it be true, because I am not able to reduce it to practise; so because I do not clearly understand his meaning, and what is

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the true nature of the Instruments he would have us employ, I will not take upon me to determine, whether or no, the *Sulphurs* he teaches us to be obtainable by this method, be genuine ones, and fit to decide the question we are now considering.

But whatever become of this obscure *Paracelsian* process, what I was saying about a sort of body's less remote than the formerly describ'd *Crocus's* from the true *Sulphurs* of Metalls (if they have any such) may well subsist. For I remember we have sometimes (though the Experiment did not alwayes succeed) by cementing very thin plates of a certain Metall with burned allum, and afterwards dexterously elevating the more dispos'd parts with Sal-Armoniack, obtain'd a sublimate, from whence we separated, by ablution with faire water that dissolved the Salt, a substance, which by its inflammability appeared a kind of metalline Sulphur.

And this may suffice touching the first scruple I thought fit to propose concerning the factitious Sulphurs of metalls

metalls and Minerals. (To proceed therefore now to my *second* scruple,) it may I think be suspected, that even this sort of Body's which I have mentioned to have been drawn from a Metall and from *Antimony*, may not be the effects of a *bare separation* of preexistent *Sulphur*, from the other Ingredients of the Bodies that yeilded them, but new Concretes produc'd by the *operation* of the Fire on those Bodies, and by the *combination* of some of their parts with those of the *additament*, employed to obtaine the *Sulphurs*. For, as far as I have yet seen, either Salt-peter crude or distill'd, or Menstruums made of it, or of other Salts, or else Oleaginous liquors, are wont to be made use of on these occasions. And 'tis very possible, that some of the more dispos'd parts of these additaments may associate themselves with those of the Minerall or Metall to be wrought upon; and so from this Combination of the Ingredients, there may result a Body of a new Texture, which Texture may dispose it to be combustible, or inflammable, whether

ther the Ingredients in their separate condition were so or not. As I remember I have elsewhere shown, that though *Aqua Fortis* be not inflammable, nor a piece of Crude Copper inflammable or combustible in a common moderate fire, yet the Metall being dissolv'd in *Aqua fortis*, and the superfluous moisture warily exhal'd, there will remaine a fusible Concrete, wherein the Copper being much comminuted, and its small parts fitly associated with the saline ones of the *Menstruum*, compose a kind of Vitriol that being held to the flame of a Candle, or even of a piece of Paper, will readily burne away in a flame finely colour'd; and which may, if one please, be kept in a flame distinct from the other.

To conclude what I have to say about my second scruple; it seems not improbable, that if any of the Metalls be by a fit *Menstruum* or some other congruous additaments, reduc'd to parts minute enough, and that these parts be fitly associated with some of those of the *Menstruum*; the Metall may thereby be brought

brought to burne or flame, as I have successfully tryed by a way elsewhere declared, upon *Gold* it selfe, whose Sulphur the Chymists would have us looke upon, as (what seems not very agreeable to the Nature of Sulphur) incombustible, so that, for ought yet appears, 'tis allowable to suspect, that the Sulphur *obtain'd* from this or that Metall, is not *so much* an Elementary or Hypostaticall Principle barely extracted, as 'tis a Magistery, or some other new compound, made by the Combination of the Metalline particles with all or some of the Body that workes on them. But if a Chymist *will have* Metalline preparations of this kind to be Sulphurs; I may be allowed to make them serve for Instances of the Producibleness of Sulphurs.

Yet these doubts concerning the Sulphurs of Metals I propose, but as *suspitions*, to draw on further, and more accurate Tryalls; by which perchance they may be happily remov'd. And speaking of the *Sulphureous Principle* of mixt body's, in that general notion of it, wherein

the Chymists often use it, and indeed must employ it; we may be thought to have said enough to our present purpose, though we had left *Mineral Sulphurs* untouch'd; since wee have shewn, that inflammable parts of mixt bodies may be *produc'd*, and therefore cannot be safely affirm'd to have *all* been *preexistent* in them.

The

The forth Part.

Of the Production of Mercury;

THe complaint I have divers times had occasion to make, of the darkness and ambiguity that Chymists have allowed themselves, if not affected, in treating of their *Three Principles*, is applicable to nothing more justly than to what they have written, about that which they call *Mercury*. For when they would seem to tell us what they mean by that Principle, they are wont to do it, in terms so loose and so ambiguous, that the representations they make of it, are more like to Panegyricks, and sometimes to Riddles, than to *clear definitions*, or so much as *good descriptions*. Since then they have given us no settled notion of what they call *Mercury*, but have left us to guess what they mean by it; I hope a mistake about it (if I should run into any)

would appeare pardonable. That which is agreed on by the most of Chymists, when they speake somewhat intelligibly of the Principle they call *Mercury*, is, that 'tis a crude substance, and that 'tis a volatile liquor, which by being so, may be distinguish'd from the *Saline* principles, especially from the *Alcalizate* or *fixt* salt, as it may also be from the oyle or *sulphur*, by it's not being inflammable. But these marks will not discriminate it, from *Phlegme*, which is also a fugitive and unflammable liquor; and therefore to make the difference, they must add some other quality, such as *sapor*, (which yet agrees not to *Quicksilver* it self,) that is wanting to *Phlegme*. So that according to this doctrine, the nature of a Chymicall *Mercury* or *Spirit* will consist, in its being a liquor volatile, not inflammable like oyle or sulphur, nor yet insipid like phlegm: How odd a principle this must be, that comprises such differing body's, as are *Acid spirits*, as those of Nitre and Vitriol; *Urinous*, as those of blood, Harishorne; &c. and *Anonymous* ones;

as those of Guajacum, Honey, Raisons, and &c. forc'd from their acidity; and the running Mercury's of Minerals and Metals, as Cinnaber, Antimony, and Lead; under one Principle, which to deserve that name ought to have all the portions of matter belonging to it *Homogeneous*; I may safely leave any considering Naturalist to Judge. And therefore instead of taking further notice of this, it may suffice for my present purpose to mind you, that as for the *Mercury's* or uninflamable *spirits* of Vegetables and Animals, I have endeavour'd to show their production where I discourse of that of *spirits and volatile salts*. And therefore I need but say something of the Production of *Mercury* more properly so called, that is, *running Mercury*: about which perhaps it will not be less acceptable to you, and I am sure it will be less troublesome to me, if I leave you to gather my opinion out of three papers, that were written for differing *Vertuosi*, at severall times, and on distinct occasions; upon which account, besides those particulars

particulars that relate to our present Argument, you will perchance find some things, that you have not elsewhere mett with.

When

*Whether Mercury may be obtained from
Metals and Minerals,
Or
(To speake Chymically) An dentur
Mercurii Corporum?*

THat there may be extracted or obtained from Metals and Minerals a fluid substance, in the forme of running *Mercury*, is the common opinion of Chymists; in who's books we may meet with many processes, to make these *Mercury's*: which because they are said to be offorded by Minerall, and especially Metalline bodies, these Writers affect to call (how aptly I now examine not) *Mercurios corporum*.

But notwithstanding all this, divers of the more learned of the Spagirists themselves, have look'd upon the pretension of other Chymists to the art of making these *Mercury's* as but a Chymical brag: and some judicious modern Writers, applauded therein by most of the mechanickall Philosophers,

phers, have proceeded so far, as to explode all these *Mercury's* of body's as meer *non entia Chymica*, nay some of them have not scrupl'd to censure all those who pretend to have seen or made any of them, as credulous or Impostors.

In the management of this controverſie, I confeſſe I am not ſatisfy'd, with either of the contending parties; and therefore though I ſhall not reſuſe to comply with your Curioſity to receive in a few lines my thoughts, whither there are or may be any ſuch *Mercury's* as are diſputed of; yet I deſire leave to premiſe ſuch a ſtate of the controverſie, as I think will avoid ſome verball janglings; and at leaſt acquaint you clearely with the ſenſe wherein I deſire to have my opinion underſtood.

Waving then, in the preſent enquiry, the Queſtion that may occur; *Whether or no the Mercury's ſaid to be obtain'd from Metals and Minerals are primitive ingredients, or Hypoſtaticall Principles only extracted or ſeparated from*

from the body's that afford'd them? I shall propose the question in these terms: *Whither or no from a Metall or Minerall body, there may, without the addition of any body, that we may be sure has any common Quick-silver in it, be obtained, by the help of Art, a substance resembling common Quicksilver, by being ponderous, fluid when actually cold, Amalgamable with Gold. and some other metals, and indisposed to wet or stick to ones hand, or to body's not of a Metalline nature.*

To give you now my present thoughts, about this question, I shall offer them to your consideration, in the following propositions.

There are divers processes of making the mercury's of body's, that are so darkly deliver'd, that the generality of Chymists cannot sufficiently understand them, to be able to try them; for some of these processes are set down in termes of Art, which, for their great darknesse or ambiguity, are not to be understood but by the authors themselves, or those who are vers'd in the *The first proposition.*
more

more mysterious parts of *Hermetick* Philosophy. And others there are of these processes, that require some *menstruum* salts, or other instruments, that 'tis not in the power of ordinary Chymists to procure. Instances of this kind may be frequently enough mett with, by those that have the curiosity to peruse heedfully the Writings of those that passe for the *Adept Philosophers*. And for a *specimen* of such processes, I am content to annex to the close of this paper, the way delivered by *Lullius* of making *Mercury* of Silver, *Helmont's* way of preparing *Mercury* of Lead, and *Paracelsus's* way of extracting the *Mercury's* of all Metals.

The second
Proposition.

There are divers processes to make *Mercury's* of body's, that are either false, or accompanied with circumstances that make them unfitt to be trust'd. For there are of these process's that having been curiously try'd, by those that had a great desire to find them true, have not been found to succeed at all in practice. Hence we have so many complaints of Chymists, that have

have lost their labour in endeavouring to make according to *Beguinus's* directions (in his *Tyrocinium Chymicum*) the Mercury of Silver, though I do not take that to be one of the difficultest to be prepared; and he that converses much among those that have made attempts to make the *Mercury's* of other body's, as Gold, Antimony, &c. according to the vulgar processes extant in Chymicall books, will (if I mistake not) find by their confessions, how little the events of their endeavours answer their labours and expectations. Nor doe all the Manuscript processes that are communicated to private freinds, as great *Arcana*, much excell those I have been speaking of; as severall of my acquaintance have complained to me, that they have found to their coste. And here not to mention my own experience (which by the help of good Principles made me timely desist from unlikely attempts) amongst the many Chymists I have known, I remember not to have found above three or four credible persons, that would affirme to me, that they made or saw made the *Mercury* of any

ny metall or minerall (except of native *Cinnaber*, which is the natural oar of Quicksilver) in a constant way, by any proceſſe he had found in printed books, ſo that, ſo many of theſe proceſſes having been upon triall found falſe, wary men may be excus'd, if they do not think fit to beleeeve other proceſſes of *mercurification*: which though not yet try'd ſeem'd not more probable; than thoſe that have been already found ſo unſucceſſful, that not only many learned modern Naturaliſts, but *Angelus Sala*, and divers others eminent Chymiſts themſelves, have publiſh'd to the world, that theſe *Mercury's* are to be found no where, but in the bragging Chymiſts books and promiſes; and ſome have, as has been already intimated, gone ſo far as to brand all thoſe, for cheats, that pretend they can make ſuch *Mercury's*, and thoſe for credulous that believe they can be made. But what I think of this ſevere opinion I ſhall quickly have occaſion to declare.

The third

propoſition.

There are ſome proceſſes, wherein it is thought that the Mercury of a metall

or

or Minerall is obtained; when indeed the obtain'd substance is misnam'd, or the true Mercury that is said to be extracted, was put in, though in a disguised forme, by the operator.

I will not here give instances of the subtile cheats, that may be put upon the ignorant and unwary, and sometimes too upon the skilfull, if they be not also cautious; but shall content my selfe to illustrate the proposition, by a few known and therefore innocent instances; and first there are some, who finding themselves unable to make the true Mercury's of metals or minerals, make bold to ascribe the name of Mercury's, to productions who's qualities are very remote from those, that are agreed to be essentiall to Quicksilver. Thus *Globe-rus* speaks much of his Mercury of *Luna*, which yet is far from being running Mercury, or having the ponderosity and other properties of true Quicksilver. So *Angelus Sala* himselfe in his Anatomy of *Antimony* would have us to look upon the Reguline parts of that mineral, as its mercury: because

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he takes it for granted, it must contain *mercury*, and is pleased to fancy no other can be obtained from it. But the difference of the Reguline part of Antimony, and running mercury in point of consistence, gravity, and other quality's, will, I presume, indispose men to confound them. And therefore, I will proceed, to confirm the second part of our proposition; by shewing that the *Mercury* obtained by some processes that may succeed, made part of the Additament imploy'd by the Artist in the operations, and so was not properly extracted from the metal, but only recovered from the body, compounded of the metal and the Additament. Of this, I remember, I have elsewhere given an easy instance, in a deluding experiment, that I long since shewed some *Vertuosi*, in who's presence having mingled the filings of Copper with a certaine salt, and put them in a conveniently shap'd vessel of Glass, I warily held it over a competent fire of well kindled charcoals, till the salt was thoroughly melted, and in part sublim'd:
by

by which operation the Copper seem'd to be quite chang'd, especially in colour, and was really become inflammable, and there remained in the lower part of the Glass, a pretty deal of running *Mercury*, so that they would have gone away perswaded, that they did see me make the *Mercury of Venus*, if I had not been carefull to undeceive them, which I did by telling them, that this Quicksilver was only the common *Mercury*, that lay disguised in the compounded Sublimate I had imployed together with the Copper, which set the *Mercury* at liberty from the corrosive salts it lay concealed in before, by presenting them a Metall more disposed to be wrought on by them than Quicksilver is.

It is possible to obtain, att least from some metals and Minerals, true running Mercury, that cannot be justly thought to come meerly from the additament. This

The fourth proposition.

This proposition a Chymist might more compendiously express by turning it into this short Assertion, Dantur Mercurarii corporum; but I thought the words

I have imployed would expresse my sense more warily and clearly ; and yet *ex abundanti*, I shall add this further explication, that though the proposition speaks affirmatively , but of *some* Metals and Minerals ; yet it does not deny, either that *more* Minerals or that *all* Metals may afford true running *Mercury*: by which I understand (according to what I formerly noted) a Minerall body fluid, opacous, exceeding ponderous , Amalgamable with Gold , and not apt to wet or stick to one's fingers, or any other body's besides some Metalline and Mineral ones.

That such a Mercury may be obtained without the help of Additaments, whereof Quicksilver is an ingredient, I have been perswaded to believe by the following observations.

I remember that many years ago, having had an occasion to distill Copper with certaine saline substances, I was not a little surpris'd to find in the vessels (that had been luted together)

gether) some globules of running *Mercury*, which I could not reasonably suspect to come from the Ad-ditament, which was not Sublimate, nor any thinge I could Judge to containe Quicksilver. And though the indisposition I had to admitt the *Mercury's* of body's, that so many learned men looked upon as non entities, made me somewhat diffident of the genuineness of the *Mercury* I had obtained, (whereof I had not quantity enough to make Just tryals) yet afterwards, when I found that accidents of the like nature had happen'd to severall of my freinds, I began to think, that what I had kept on-ly for a few dayes as a questionable rarity, might really have been *Venerial Mercury*.

A laborious Chymist of my acquaintance comming to visit me once when I was not well, was very earnest with me to communicate to him the way of making the *Mercury* of *Antimony* and of *Saturn*, and when I told him that I had no such processes of my own, and that I was far

from believing those that I had mett with in printed books, to be true ones, he would not acquiesce in this answer, but declaring that he resolved to make attempts to gain such *Mercury's*, and had rather do it, by Methods of my proposing, than of his own devising, he pressed me so much to let him know which way I would go to work, in case I had the same design, that he then had, that to be rid of his importunity, I told him what on a sudden came into my thoughts: and as sometimes the mind, being put to such plunges, happens upon a lucky hit, and such as much premeditation would not have led it to: so it happen'd at that time to me, for when I, because of my distemper, had forgot this affair, the Chymist, who was a plain honest man, came to me with great joy to give me thanks for the instructions I had given him, bringing along with him some *Mercury of Antimony*, and a little *Mercury of Lead*, that he had already made by the help of those instructions; by pursuing which, he expected to obtaine much more *Mercury* from the Minerals when they

they should be longer digested with the concourse of the air, in those Salts that I had advised him to grind with them. This pleasing success of directions, which I had as to divers particulars forgotten, made me desire them of the Chymist, who, beginning to be proud of his attainment, when he perceived I remembered not so much as he thought I did, ungratefully delay'd to bring me the account he promised me at first, till the plague reaching to the place where he lived, and dispatching him, deprived me of the hopes of satisfying my curiosity.

Two gentlemen of my acquaintance, but unacquainted with each other, working almost at the same time upon Silver, did each of them to his wonder, find parts of his Silver turned into running *Mercury*, with which odd accident each of them came to acquaint me, bringing along with them a little portion of the unexpected *Mercury*; one of these portions a servant of mine lost by mistake before I could try any thinge with it; the other I found by a tryall unknown

to the maker of it, not to be common, but metalline *Mercury*; of which the Chymist complained to me, that he had, sometimes had considerable quantity's to his great loss. because much of the Silver he employed in an operation, that he expected would prove *Lucriferous*, being turned into Quicksilver had swallowed up all his gaine, and this was that which invited him to apply himselfe to me, hoping to be able to prevent or remedy this inconvenience by my advice, which I willingly gave him, but because of his departure out of *England*, could not know with what success.

+ A fellow-traveller of mine, having occasion to employ a saline body about *Lead*, after he had finish'd his operation, left the Lead and salt together for some months, in a vessel which he lay'd by in a Garret, where the air had access to it, afterwards wanting such a vessel, and not being able to supply himselfe readily in the country (in which his experiment was made) he remembered this long neglected

ed vessel, and coming to see whither it was fitt for his turn, he found to his wonder, that tho he had employ'd no Mercuriall body to work upon the *Lead*, yet part of it was already turned into *Quicksilver*, separable by straining, and more seem'd in a near disposition to admitt the like Change: Whereupon he brought me, as a rarity, a part of the Metall and a little of the Mercury, which I found by experience on Gold, to be of a Nobler kind than common *Mercury*. And I the less wondred at this Mercurification, because examining the Gentleman that chanced to make it, I found the maine thinge he had employed in the operation was common, or Sea-salt:

An expert Metallist of my acquaintance, being desirous to try, what Gold and Silver he could gett out of a fine *English Marchasite* I had presented him at his desire, he examined it according to his method, without any Mercurial preparation, and found to his surprise, that it yeelded him, besides other things, some running *Mercury*,

cury, which he brought and gave me, because it was afforded by the *Marchasite* I had presented him.

The *Mercury* of *Antimony* more than one of my friends have made, by unsuspected additaments, such as salts, that have nothing to do with Sublimate, or other compositions whereof common *Mercury* is an Ingredient. One of these Antimonial *Mercury's* look'd so oddly, that though it were made by distillation, I had that curiosity to try, whether it would not operate on Gold, in a peculiar manner, and having accordingly put a little fine *calx* of that metall (as about half a drachme or a drachme) into the palm of my hand, I added to it an equal or double weight of the above mention'd *Mercury*, That immediately incorporated with a very manifest heat. And this was the quick way I used to examine other *Mercury's* of body's, for though this alone be not a certaine signe of a *Mercury's* being of that sort, because I can obtain a *Mercury* so qualify'd by another way than any I have hitherto

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to mentioned; yet as their assertions and relations gave me sufficient ground to conclude, that they had obtained those *Mercury's* from the body's that they affirm to have yeelded them; so the readiness of these *Mercury's* to mix with Gold, without the help of fire, and even to grow hot with it, which vulgar *Mercury* will not do, confirmed, that they were Metalline *Mercury's*, rather than of the same kind with common Quick-silver. And my way of obtaining incalcescent *Mercury* is so quite differing from any of those, that there was not the least cause to suspect, that the *Mercury's* of body's we have been mentioning were so obtain'd, especially, since I knew that my way was unknown to most of the persons I have mentioned, and was practis'd by none of them.

As for the *Mercury* of Gold, though I think I have brought a great many parts of crude Gold to assume a Mercurial forme, and to come over in that forme by distillation (whatever divers learned men think of the insuperable

perable fixity of Gold) yet I confesse I have not seen any *Mercury*, that I was satisfy'd did deserve the Name of the *Mercury* of that metall: But happening to be once in a place, Where a forreiner, that was a stranger to me, was showing a freind of his, with whom I had some little acquaintance, a Metalline experiment, that I confesse, I could not but admire (for this Forreiner was so civil, because I came so luckily in, as to let me be present att the experiment, though not to discover any thing of the drug he imployed about it:) I made bold to ask this civill Traveller who seem'd a candid Man and I perceiv'd had seen uncommon things; Whither he had mett with any way of making *Mercury* of *Gold*: to which he answered, that he knew no such way himselfe, but that he mett (some-while before) with a very learned Man, in comparison of whom, he confessed himselfe but a Novice, that put some *Gold* into a little vial, full of a certaine *menstruum*, which my relator owned he knew not how to prepare, and intimated to him, that this

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Menstruum would have a peculiar operation as well upon *Gold* as *Silver*. Afterward this Relatour having put the Vial well stop't into his pocket, and carried it about with him, was, when he came home and took it out to set it aside, much surpris'd to find, instead of the *Gold* he had seen put in, a pretty quantity of running *Mercury*. Which the Artist, who only lent him the *Menstruum*, did not seem to think strange, when he was made acquainted with it.

If I would relate what I have heard from Men, that I judge to be either easily, deceivable themselves, or concerned in point of interest to deceive others, or at least of a vain glorious bragging humour; I might easily swell this discourse to a greater bulk: But I have been carefull, to mention only those relations to which my selfe, in spite of my longe backwardnes to beleeve such things, saw cause to give assent. And if it be objected, these instances were but casual experiments, notwithstanding which there may be no settled way for the obtaining the
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Mercury's of body's: I might Answer, that some passages of what has been lately delivered make it probable enough, That even settled wayes of making the *Mercury's* of body's, or at least of some of them, are not unknown to some Artists: though for certaine reasons, and particularly for the ingratitude of many Men, they do not think fitt to divulge them. But to answer more home to the objection: I shall need only to say that though most of the above recited experiments may be said to have been made by chance, in this respect, that those that made them, did not principally designe the obtaining of metalline or Minerall *Mercury's*; yet the effects produced, were as naturally and necessarily consequent, to operations so managed as they were, as if the Artist had directly design'd them, as in some of the above mentioned relations they did. And it is not materiall for us to enquire whether the Quicksilver made by those experiments be to be ascribed to chance or skill, since whatever becomes of that question, it is plain, that

that if metals and Minerals could by either way be brought actually to afford running *Mercury*; there needs no more to prove, that such *Mercury's* are really obtainable from them.

Doubts

Doubts about the preexistence of Running Mercury in Metalls.

THE propos'd Question, *whether or no the Mercury's of Metalls and Mineralls be Principles preexistent in them, and only extracted from them,* may to many seem, though it do not to you, a superfluous enquiry, since the generality of Chymists of differing ages and Countries, have resolutely determined it in the affirmative: which is not at all to be wondred at, since according to their *Hypothesis* of the *Tria-prima*, (or three Hypostaticall principles) whereof they presume all perfectly mix'd bodies to be composed, Metalls, being of this sort, must consist of *Mercury*, as well as of *Salt* and *Sulphur*; and consequently must afford it upon the *Analysis* of the body into its three Primordial ingredients. But notwithstanding all this, the *Problem* seems to me difficult enough to be resolv'd, partly because supposing that there be
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true metalline *Mercury's* preparable by Chymists, they very studiously conceal the wayes of preparation; and partly because as 'tis very difficult to obtain any of the factitious *Mercury's*, wherewith to make such luciferous tryalls as a Naturalist would designe; so those few Authors that affirm themselves to have possess'd such *Mercury's*, have given us but an exceeding lame and defective account of them, not mentioning those particulars which are most proper and desirable, in order to the passing a right judgement about them. I pretend not therefore, to answer your question otherwise than conjecturally, till I shall be better furnish'd with matters of fact. But in the meanwhile that I may comply with your Curiosity, as much as I safely can; I shall confess to you, that for the present I am, by as much information as yet I have had, inclined to think, that the *Mercury's* obtained from Metalls do not clearly appear to have been preexistent in them, and only separated from them by the Artist, but that I think that at least some of them

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may be rather fluid Magisteries of Metalls than their extracted Principles. One of the most obvious things, that suggested this suspicion to me, was, that whilst some Metalls, as *Tin* and *Lead*, are in fusion, they would, to one that should not know of their being melted, appear to be many parcels of *Mercury*: since like it they are fluid and ponderous, and stick not to the Crucibles, or to Stones, Bricks, or almost any other bodies, except some metalline ones, divers of which they will easily pierce into, as *Quicksilver* does into *Silver* or *Gold*; so that if the fluidity of these metalls were permanent, they might pass for *Mercury's*. And if in the Moon and some of the other Stars, as there are Mountains, so there are metalline Mines in case the heat of the Climate or of the Soyle should keep them constantly in such a degree of heat, as we here find sufficient to melt *Lead* (which we know needs not be very intense) these metalls would there emulate the nature of *Mercury's*, as I have learned from Travellers, that in divers parts of the
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Torrid Zone, what would here be Butter, is fluid as well as unctious like oyl, and is sold like other liquors, by measure not by weight: and an inquisitive Man, who is a Scholar as well as a Traveller, assured me, that whilst he was in some parts of the *Indies* he furnish'd himself with some liquid substances afforded by wounded Plants, that as soon as he came near *Europe*, and not before, turned into consistent and pulverable bodies; it did not therefore seem to me impossible, that the peircing salts, and other subtle body's employ'd by Artists, about the Mercurification (as some stile it) of mettalls, may either by the agility of their own nature, or by so altering the shapes, and loosing the wonted cohesion of the mettalline corpuscles, bring them to have such a Texture and such pores, as may enable the Ethereall substance, whereto so many other bodies owe their fluidity, to agitate them. These causes I say, or some other that may be propos'd, may possibly keep the prepared mettall fluid; as we see, That though *Cam-*

phire be a consistent and tough body, yet some Nitrous spirits of *Aqua-fortis* will easily penetrate it, and may be brought to stay so long with it, that I have for curiosity sake kept the oyle of *Camphire* severall years without loss of its fluidity, which I found that this kind of liquor would retain, though for tryalls sake I expos'd it to intense degrees of Cold, such as would freeze divers other liquors. Nor did it to me seem impossible, that a small quantity of appropriated Additament might suffice to put a mettall into a state of fluidity; for since we see that the vapour of *Lead* can arrest *Quicksilver*, and make it a consistent body; and since *Helmont* assures us, that the liquor *Alkabeſt* being once abstracted

Est scilicet (Corallatus Paracelsi) Mercurius à quo liquor Alkabeſt ſemel diſtillatus eſt, reſidetque in fundo coagulatus & pulverabilis, nequequam in pondere auſtus aut diminutus. Helmontius in Scripto de Arcanis Paracelsi.

from running *Mercury* deprives it; and that almost irrecoverably, of its fluidity, so as to make it pulverable: it appears not, why Nature or Art may not be able to supply some corpuscles, that may expell or disable those that keep a mettall in the

the forme of a fluid body ; and especially since , as I have elsewhere shewn , the matter of mettalls themselves may (at least sometimes) have been a liquor, or some other fluid body.

Another Reason that induc'd me to suspect, that the *Mercury's* of mettalls and Mineralls are not, as 'tis presum'd, meerly extracted Principles or Ingredients, was, that I have observed a greater dissimilitude between *Mercury's* all of them quick, and furnish'd with all that is requisite to make them pass for true *Mercurys* , than will comport with the supposition, that they are simple and Primordially Body's, barely extricated from the others with which they were at first commixt. But this Argument being the subject of an intire, though short, Discourse, (of the Dissimilitude of *running Mercury*) I need not enlarge on it in this Place.

It did also strengthen my suspicion to consider, that the Chymists that

talke of the *Mercury's* they have drawn from mettalls, are not wont to tell us what other Ingredients they obtain'd by their suppos'd *Analysis's*, which left me dubious, whether they obtain'd any salt and sulphur, or not; and of what nature those substances were that they did obtain. For if these were not true salt and sulphur, the genuinenesse of the *Analysis* might be question'd; because it may be alledg'd, that the Chymical Operation and the Additament turning some parts of the mettall into Decompounded Bodies, which must be acknowledg'd not to have been (in such) formes preexistent in them, may also have by change of Texture turn'd some other parts of the mettall into the forme of *Mercury*.

To the foregoing Considerations afforded me chiefly by the nature of the thing, I shall for the sake of those that are mov'd by the authority of *Adept Philosophers*, as they call them, add that, which among them ought to pass for a Proove, from Experience.

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For *Raymund Lully*, whom I take to be one of the greatest Chymicall Philosophers whose Writings are come to our hands, though in many of his other Bookes he speakes of *Mercury* in a darke and Allegoricall sense; yet in that excellent little Tract which he calls his *Clavicula*, Vide Lullium in Clavicula. cap. 2. he delivers a Process, (which is not to be wrought with vulgar *Menstruums*, though they beare the same names with those he prescribes and names) From the close whereof it seemes manifest, that his Designing was not to extract a preexistent *Quicksilver* out of the mettall propos'd, but to turne the mettall into *Quicksilver*; since he orders and directs us to prosecute the *Mercurification*, till the obtained *Quicksilver* be equall in weight to the Silver that was to be transmuted. And partly upon this I have ventured to ground the foregoing *Paradox*; That the *Mercuries* of Bodies are rather *Magisteries* than *Extracts*. For in this *Lullian* Process, it appears not, that the Mercuriall Principle was extracted from the Salt and Sulphur, but rather that the Body of the

metall (without being Analyzed) was turn'd into Mercury: and though *Magistry* be a terme variously enough employ'd by Chymists, and particularly used by *Paracelsus* to signify very different things ; yet the best notion I know of it , and that which I find authoriz'd even by *Paracelsus* in some Passages , where he expresses himselfe more distinctly, is, that it is a Preparation , whereby there is not an *Analysis* made of the Body assign'd , nor an extraction of this or that Principle , but the whole , or very near the whole Body , by the help of some additament greater or less , is turn'd into a Body of another kind. As when Iron or Copper by an acid *Menstruum* , that corrodes and associates it selfe with it , is turn'd into Vitriol of *Mars* or of *Venus* ; and *Quicksilver* having a sufficient quantity of *Aqua fortis* strongly abstracted from it , is changed into a red Precipitate ; or by being sublim'd up with common Sulphur , is turn'd into *Cinnabar* ; or , to give yet a more apposite example , when *Quicksilver* (which is the Body we

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treat of) is by the lasting operation of the fire, without external Additaments, at least distinct from the Igneous Particles, turn'd into a red Powder, that Chymists call *Precipitate per se*.

I have received credible information and some proof too, that there is a place in *Transylvania*, where portions of *Running Mercury*, which when they fall out of the Earth and lye a while in the Air, do of themselves coagulate into permanently hard bodies: so little a distance hath Nature her selfe there put between the Mercuriall fluidity, and the solid consistence of the same portion of matter. So that if so small a thing (and perhaps unponderable as well as invisible) as the Contract of the Air can expell, is able by its presence to retain a minerall body in the form of a true *running Mercury*, as well as by its recess to leave a solid body, I see not why it should be impossible for Art to interclose some very minute and restless particles, which by their various
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and incessant motions, may keepe a Mettalline body in the state of fluidity; much after some such way, as I lately noted, that the spirits of *Nitre* did for whole years together keepe *Camphire* in the forme of a liquid oyle.

Having now propos'd some of the considerations, that inclin'd me to think, that the *Mercuries* obtained from Mettalls and Mineralls, may not have been preexistent in them; the impartiality that I think becomes a Naturalist, obliges me, to take notice also of those things, that occur'd to me, in favour of the received opinion of the Chymists, in behalfe of which, I objected to my selfe divers specious Arguments.

Of these, the first was, the generall Consent of Chymists, who take it for granted that all Mettalls are composed of *Mercury* as a materiall Principle, and commonly more copious than any other constituent part of those bodies; but this being an Argument, drawn only from authority, was of small weight with me, in a Controversy, pro-

properly determinable by reason and experience.

2. A second objection was afforded me, by many processes I had mett with in Chymists Books, to extract the *Mercuries*, as well as the *Sulphurs* and *Salts* of mettalls. But neither did this Argument appear to me of any great moment, for most of these processes I look'd upon as fictitious things: which if the Authors of them, had taken the paines to try themselves, they would have found not to succeed in practice, and scarce any of them was so skilfully fram'd, as to satisfy a considering Naturalist, in case it had succeeded; that the obtain'd *Mercury*, was a pure Principle only separated or extracted, from the other Ingredients of the mettalls, and not a result of some mettalline parts conjoyn'd with some parts of the additament, as it seem'd manifest enough to me; that the supposed salts of mettalls that are pretended to be made, by such preparations, are not the Principles of such mettalls, but new concretions, and indeed not simple, but decompounded

ded bodies ; as is evident in the salt or sugar of *Lead* made with the spirit of Vinegar ; and in the salt of *Steel* made with that, or other acids.

3. A third objection, and of greater weight, seem'd derivable from this consideration, that *Quicksilver* easily *Amalgams*, with mettalls, because of its cognation with the Mercuriall part these bodies abound with.

4. And this Argument appear'd capable of being strengthen'd by a more considerable one: which is, That the gravity of the mettalls is such, as cannot reasonably be deduc'd from any other cause, than an abundance of the Mercuriall Principle, their being no other bodies (known to us) besides *Quicksilver*, that are near so ponderous as mettalls.

These two objections, I thought fit, to couch together, to be able in fewer words, to answer them both; I considered then that *Amalgamation* being in effect, but a kind of dissolution of mettalls, in a *Menstruum* or fluid body;
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for such *Mercury* is in reference to them; there is no necessity, that the Solvent, should find in the Metall, a copious ingredient just of its own nature: for dissolution depends not, so much upon the pretended cognation between the Solvent and the body it is to work on, as upon the congruity, as to size and figure, between the pores of the latter and the corpuscles of the former. As may appear by the Solution of *Ivory* and *Harts-horn* (which belong to the Animal kingdome) that may be made with *Aqua fortis*; and by that, which I have elsewhere shewn may be made of *Zink*, and even of *Copper*, by the spirit of Vinegar, the Urinous spirit of *Sal-Armoniack*, and spirit of *Vitriol* separatly imployed; though the first of them be a *Menstruum* drawn from a Vegetable, the second from an Animal, the third from a Mineral substance. And as for *Amalgamations* themselves, I observe, that the facility *Mercury* finds in joyning with a metall, does not barely depend upon the Plenty of the Mercuriall ingredient, contain'd in the mettall, at least

least if the greater ponderosity, or specifick gravity of the metall depend upon the copiousness of the same Mercurial Principle, or ingredient, as the fourth objection supposeth: for we finde by experience, that *Mercury* will far more easily *Amalgamate* with *Tin* than with *Copper*, which yet is much more heavie than it; nay than with *Silver*, which is a good deal heavier, (in Specie) than *Copper*; And is by Chymists presum'd to be much nearer of kin to *Mercury* than is *Tin*. To which I shall add, that although *Mars* be specifically heavier than *Tin*, yet it is far from being more easily Amalgamable with *Mercury*, that though *Tin* will readily admitt this Minerall liquor, without the help of heat, there is no way vulgarly known to Chymists to make an immediate Amalgamate between *Mercury* and *Mars*. So that one of the two objections I lately joyned together, must be declin'd: since by the tryals I have purposely made, it appears, that either the disposition of Metals to Amalgamate with *Mercury*, do's not barely depend upon the

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the suppos'd plenty of Mercury contain'd in the metall; or else that the greatness of the specifick gravity do's not depend upon the more plentiful participation of that Mercurial ingredient. Although the fourth objection be built upon a supposition, that the great ponderousness of Metals, in comparison of other bodies, can proceed from no other cause than the great quantity of Mercury they contain; I considered too, that it might be justly demanded, whence, Mercury it selfe, as well as whence Metals, derive their greater ponderosity, and I see not, why it may not be said, that both the one and the other own it to the Solidity and close order, of the corpuscles, they consist of, to which qualification it is not essential, that the portion of matter endued with them, be in a state of fluidity, rather than in one of consistence: as on the contrary we see that *Gold* and *Lead* are exceeding ponderous bodies, as well, when they are in fusion, as when they are cold and hard; and so in *Quicksilver* as well in its wonted and liquid

liquid forme, as when it is coagulated, as Chymists suppose, by the vapour of *Lead*.

But this will be somewhat further cleared in what I shall say to the fifth and last objection, that my thoughts suggested to me, and which Philosophicall candor forbids me to conceal: though I find it easier to be proposed than answer'd. It may be then alledged in the fifth place; That the *Mercuries* of mettalls must needs be but partial Principles of them, since *Quicksilver* being confessedly heavier, than either the Sulphureous or saline principle, and being specifically heavier than almost any mettall it selfe; the gravity of a mettall cannot reasonably be supposed to proceed from the whole body of the mettall, but only from some one ingredient heavier *in specie* than the rest, and, than the mettall it selfe. And this ingredient or principle can be no other, than the most ponderous body, *Mercury*.

This difficultie I confess, does keep
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me yet in some suspense, till I have further opportunity, to make such tryalls, as I think proper to clear it. Yet in the mean time, I shall offer some few things; which perhaps may lessen it, if not quite remove it.

I consider then that there is no necessity to suppose, that Metals, of what denomination soever, as *Tin*, *Iron*, *Silver*, or *Gold*, are body's perfectly *Homogeneous*, though they seem such to our eyes. This supposition I elsewhere purposely discours of, but in this place I need not spend time about it; since the Chymists (who are those I now reason with) do not only allow, but teach it, since they will have Metals as well as other mixt body's to consist of three Hypo-
statical principles, whereof *Mercury* is one, although it must be much heavier *in Specie*, than either the *Salt* or the *Sulphur* it is blended with: because it is from the participation of that ingredient that they derive the great ponderousness which Metals have in comparison of other bodies.

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And to this granted supposition, I see not why it should be absurd, to add this other, That the more solid and heavie particles or corpuscles of a Metal, may lye in it, not in the forme of fluid or Mercurial, but consistent parts, and that these may be more disposed than the rest to be brought by Chymicall additaments and the operation of the fire into the forme of a running Mercury. Nor ought it to be judged incredible that the forementioned solid portion of the Metal, should be more ponderous than Quicksilver, since as I have often tryed, *Gold*, though a consistent body, is far heavier than Quicksilver, to the bare participation whereof, *Gold* cannot owe its specifick gravity.

If this *Hypothesis* be admitted, it will be easie to give an account how the Mercury of a Metal may be heavier in *Specie* (that is, bulk for bulk) than the Metal that afforded it; for the difficultie is easily resolved, by saying, that the solid parts, which by the Chymical operation, are reduc'd
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into the forme of *Quicksilver*, were far more ponderous in kind than the other parts of the Metal, which being also associated with them did by their comparative lightness make the entire Metal less heavy (if the bulks be equall'd) than an aggregate or convention of all the solid parts alone would have been. Which may be illustrated, by what I have heedfully observed, of the decrement of specifick gravity, sustained by *Quicksilver*, when it is united by Sublimation either with Sulphur into Cinnabar, or with Salts in Corrosive Sublimate.

But I must not dissemble, that against the forgoing discourse there occur'd to me a couple of Arguments (that I have not mett with amongst Chymists) whereof the latter is very considerable. For I foresaw it might be alledged, first, that the *Mercuries* of Metals being in a liquid forme, could not well be supposed, to be so close and ponderous bodi's, as our *Hypothesis* requires: and next, That we our selves admitt an experiment of *Raymund Lully*, whereby

he pretends to reduce the whole body of *Silver* into *Mercury*, which is a heavier substance than *Silver*; and in this case we cannot have recourse to this answer, That the corpuscles, which assume the forme of *Mercury*, were far more ponderous, than the others, that concurred with them to compose the metall.

This twofold objection, I do not pretend to answer at once, but may perhaps enervate it by degrees.

And first, though it be very possible, that a pretty quantity of additament may be employ'd about the *Mercurification* (to speak in the Chymists language) of a metall, yet there shall really and finally adhere to the metalline parts, but a very small proportion of Additament, that will continue with them, and keep them in a Mercuriall flux. And it may appear the more credible, that a very small quantity of additionall matter, may have a very great stroke in altering the consistence of that which is obtain'd from a metall, as its most ponderous portion;

portion: if you consider with me, that the bare accession of Igneous particles, is able in time, to turn *running Mercury*. Nor must I pretermitt on this occasion, a notable passage I remember to have met with in *Helmont*, who relates, that by the abstraction of the liquor *Alkabeſt* (which is wont to come all over in distillation from common *Quicksilver*) he did quite deprive it of its fluidity, and turn'd it into a consistent body, and even into a fix'd one; whereby you may see how little a quantity of matter will serve to change the consistence of a body of a Mercuriall Nature.

Besides that, a fluid forme do's not alwaies argue the lightness of the body, that it is found in, since it may consist of particles, so solid and so numerous, that notwithstanding their intestine motion, the body they compose may be very ponderous: as may appeare by red hot Iron, melted Lead, and which is an Instance apposite to our purpose, in common *Quicksilver*, which though fluid is heavier than

any known body in the world, Gold excepted.

But I consider farther, that though the solid portion of a metall retain more of the additaments imploy'd to bring it into the forme of *Mercury*, than it can be prov'd to contain, yet this disadvantage may be compensated by the new disposition of parts, that the Mercurifi'd portion acquir's, by the operation that turn's it into a liquor, and may be suppos'd to bring the parts to a closer or otherwise a more expedient order than they were in before: as *Ice* when thaw'd takes up less roome, in the forme of water, than it did before it became a liquor. I see no impossibility, that the specifick gravity of metalline bodies may be increased or diminish'd by such small proportions of additaments, as do not at all considerably add to their absolute gravi.y. This the Chymists ought not to deny, if they consider what themselves grant, of the efficacy of what they call the *Philosophers Stone*, whereof they tell us, that one grain, if it be of a nobler order

der or degree, may transmute a whole pound of *Quicksilver* into perfect Gold; and consequently the specific gravity of a metall is notably changed by an additament, which (according to the differing pounds used in severall Countreys) amounts not perhaps to the 6, or 7. thousand part of its weight. Besides, the transmuting powder being a Compounded body, whereof but part is *Gold*, may probably be suppos'd to be more light *in specie* than the metall that by addition of it is produc'd; which being pure *Gold* is the ponderousest body yet known to us. And to confirme the Argument, I shall add, that there is a way, though I pretend not to know it, of making a metall far lighter *in specie*, than it naturally is, by the addition of less than a 100. part of its weight, as experience has convinc'd me.

Wherefore to come now to the grand objection furnish'd by *Lully's* lately mention'd experiment, it will not presently follow, that if the whole body of a metall be brought into a mercuri-

all forme, this *Mercury* will swallow up and destroy our *Hypothesis*: for though I grant that in this case, it cannot be said, as in the former cases (wherein a part only of the metall is Mercurified) it may be, that the obtain'd *Quicksilver* consists of the more solid and ponderous parts of the metall; yet it may be still said, that, *for ought we know*, the *Mercury* produc'd, by the reduction of the whole metall into a fluid forme, may be specifically lighter than common *Mercury*, and so cannot be necessarily concluded to be specifically heavier than the metall that afforded it. I lately imployed the words, *for ought we know*, because we are now upon the case, wherein Philosophicall candor invited me to acknowledge, that I wanted further tryalls to give my selfe full satisfaction: for although I have had portions of the *Mercury's* of more than one or two metalls, yet it was but in small quantities; so that the other tryalls, I had the curiosity to make with them, kept me from examining their specifick gravity, and from finding by an Hydrostaticall way that I have elsewhere
decla-

declared, whether they were not lighter *in specie* than inferiour metalls, and consequently than common *Mercury*. For that *Quicksilver* may be specifically lighter than the metall that affords it, I think the Chymists cannot reasonably refuse to grant; since they allow that *running Mercury* may be obtain'd from *Gold*, and tell us great matters of it, because of its proceeding from so noble a body. Now if this *Golden Mercury* be said, (because of the suppos'd resemblance of all *Mercury's*) to be of the same specifick weight with common *Quicksilver*, then I have a notable instance, of a *Mercury* that is considerably lighter *in specie*, than the metall that afforded it. And therefore, till experience have manifested the contrary, it will not be absurd to presume, that the *Mercury's* of other metalls, may likewise be lighter *in specie*, than the respective body's from which they were obtained: but if it be said, that this *Golden Mercury*, may perhaps be as ponderous as *Gold* it selfe, or even more, then 'tis plaine, that it is possible for a Metalline body,

not-

notwithstanding its being reduc'd into the forme of a fluid, to be equi-ponderant to the Metal that afforded it. And that I may not seem to argue, altogether, from the concessions the Chymists ought to make; I will add, by way of Confirmation, a couple of things that perhaps you will think somewhat strange. Whereof the former is, That it is possible for a Metalline body to resemble another in all the manifest qualities, whereby Artists are wont to examine them, and yet they differ much from it in specifick gravity: as I had once opportunity to observe in a Metal that was not only white (within and without) like *Silver*, and very malleable, but did, when I purposely examin'd it, endure Cuppellation, and pass'd for & was reputed by a very eminent Artist that sent it me to examine, to be good *Silver* in all proofs; and yet this Metal I found by Hydrostaticall tryalls to be much lighter *in specie*, than common *Silver*. And if the famous person that sent it me, was not mistaken (for so I must not think he would knowingly misinforme me,) This odd metall may yeeld
me

me a notable instance to my present purpose, since he affirmed this metall to be made without the addition of any metalline body of *Quicksilver*, which, if this be so, must, by a change of Texture, have made a considerable loss of its specifick gravity. But to proceed to my second instance, which will be yet more apposite; I shall add, that once I had a *Mercury* which amongst other remarkable properties, that belong not to this Argument, had a very strange one; namely, that it was considerably heavier *in specie* than *common Mercury* (as I found & shewed to a great *Virtuoso* by Hydrostaticall tryall,) though it was made of a body no heavier than *common Mercury*, and by the help of additaments which were much lighter than *common Mercury*. And this was so far from being a more gross and sluggish kind of *Quicksilver* than the ordinary, that it look'd very fine, and was very agile, and had before I examined it been more than once distilled. By this it may appear, that from hence, *that a body is in a mercuriall forme*, we cannot safely determine what degree of specifick gravity

vity it has. For since by this last example it appears, that a sort of *Quick-silver* may be far more ponderous than common *Quicksilver*; it seems not unreasonable, that a sort of *Quick-silver* may be far lighter than common *Mercury*, and so perhaps lighter than the metalls that were reduc'd into that forme: it being far less likely, that the former should be produc'd than the latter, in regard there is but one minerall body in the world, that we know of, at all heavier than common *Quicksilver*; whereas there are many of those that are capable of being associated with it, that are far lighter than it.

But as I intimated above, I am unwilling to speak so positively about this matter as I might do, if I had opportunity to make the tryalls I would with the *Mercuries* of body's: only thus much I shall venture to say, that for ought yet appears, the Argument I have been answering all this while, is not cogent, since it is built upon a supposition, that the *Mercuries* afforded by metals and minerals, must be

be of the same weight with common *Mercury*; which is not only a proofless assertion, but repugnant to the Experiment lately mention'd of the distilled *Mercury*, that was heavier than common *Mercury*, and to the presumption deriv'd thence, that there may be body's, in a Mercurial forme, more light *in specie* than common *Mercury*. And whatever becomes of the opinion I incline to; The Argument I have been examining, of the Chymists, may be invalidated by what I have said, where I took notice of the notable excess of ponderosity, that pure *Gold* has in regard of common *Quicksilver*: for by that instance it plainly appears, that it is not to the participation of common *Mercury*, that metals must necessarily owe their great ponderosity; but that nature, (and Art too,) may contrive the parts of a body into so close an order, as to make that body (whether solid or fluid,) more ponderous, *bulke for bulke*, than common *Quicksilver* it selfe.

Having now dispatched what I intended

tended to say in the foregoing discourse, it remains that I performe the promise I made, of adding the waies of *Mercurification* (as Chymists speake) above referr'd too, as delivered by *Paracelsus*, *Helmont* and *Lully*: about which I must give you this advertisement, that besides the obscurities, and imperfections, that a moderate degree of attention may enable you to discover in these processes, understood in the literall sense, there are, if I much mistake not, some affected Equivocations in terms that seem very plain, and free from suspicion of ambiguity. As for instance, though the word *Sal-Armoniacum* seem to be of this sort, yet amongst *Hermetick* Philosophers it often signifies, not common *Sal-Armoniack*, which is far from being able to perform the effects they ascribe to theirs, but a very differing and much more noble and operative thing, which because it may be sublim'd like common *Sal-Armoniack*, they are pleased to call by that name: and though sometimes they give it the title of *Sal-Armoniacum Philosophorum*, yet oftentimes they

they omitt the discriminating Epithite, especially in Philosophical processes, (that is, such as those wherein they deliver their higher *Arcana*,) of which sort are many of *Paracelsus's* processes, and more (not to say most,) of *Lully's*. What is meant by *Sal-Armoniacum Philosophorum*, I think it needless to tell you here, (but may perchance do it on another occasion,) since that composition requires an Ingredient that neither of us is furnish'd with, and that you cannot procure. There may be other Ambiguities in the following processes, that will not be easily discover'd, but by such as are vers'd in the mysterious language, which some would call *canting*, of the *Hermetick* Philosophers. But I think I have said enough already to shew, that the annexed processes are fit to confirm what is delivered upon the first *Proposition* of the foregoing discourse; and therefore without offering to explain them, I shall subjoyn them in the proper terms of the respective Authors.

Ratio

*Ratio extrahendi ex omnibus
Metallis Mercurium
Paracelsica.*

Hæc extractio (Scilicet Mercurii ex
Metallis) fit per aquam Mercurialem,
quæ nec Joanni de Rupeſciſſa, nec
aliis, quicquid etiam jaſtitent, cog-
nita fuit. Ideoque diligenter
eſt cognoscenda, & indefeſſo
labore tractanda. Hoc ergo
paſſo pareretur dicta aqua
Mercurialis.

*R. lb. III. Mercurii ſublimati ſepties per
Vitriolum, Sal Nitri, & Alumen.*

Salis Armoniæ, ter à ſale ſublimati
& clari & albi iſſe Trita ſimul &
alcolizata ſublima in ſublimatorio per
are nam, horis 9. Ubi refrixerit, ſub-
limatum cum penna detrabito, & cum
reliquo ſublima, ut prius. Hanc opera-
tionem quater repete, donec amplius
non

non sublimetur, & in fundo massa nigra
 maneat instar cerae, fluens. Refrigerata
 exime, & tritam rursus in patina
 vitrea saepius cum salis Armoniaci a-
 qua, s. autem preparata, imbibe, & sua
 sponte coagulata rursus imbibe & sic-
 ca, ad 9. seu 10. usque vices, donec
 ferè non ulterius coaguletur. Tritum
 subtiliter supra Marmor in loco humi-
 do solue in oleum pulchrum, quod re-
 distificabis per distillationem in cineribus,
 ab omnibus facibus & residentia:
 Hanc aquam omnium facile principem
 diligenter asservabis, cujus R. unc. VIII. &
 impone laminas opt: solis aut Lunæ,
 optimè mundatas, pondere unc. iss. vitro
 clauso repone ad digestionem in cineres
 calidos horis 8. Corpus tuum videbis in
 fundo vasis transmutatum in subtilem
 vaporem seu Mercurium. Factâ solutio-
 ne totius aquæ Mercurialis per Alembi-
 cum lento igne à prima materia subli-
 mando separa, & in vitreo vasculo
 diligenter asservato. Habebis hoc pacto
 verissimum Mercurium corporis. Para-
 cellus in Man: de lapide Philosopho-
 rum.

Sens (saies he) cruditatem Saturni,
 pinguedine fixorum salium solubilem,
 O
 sola

solo quandoque igne carptim delebilem, sicque dividi compositi partes, crudumque Argentum vivum currere permitti. Sulphur fugitivum superans in saturno trahere ad volatum, fixum, inseparabiliter junctum. Quodque expediet imprimis Saturni sublimatio. Cujus expressione nulla est elevati ad residens, coloris aut substantiæ differentia. Unde etiam caloris, fusionis & mollietiei causis, post calcinationes & reductiones, residuis medullitus, sine igne fusionem, solitamque mollietiem minimè refutat. Helmontius, in potes. medicaminum. num. 40.

Extractio Mercurii à Corpore
Perfecto.

R Ec. unc. i. calcis Lunæ appellatæ, calcinetur modo quo dicitur in fine nostri magisterii operis, quæ quidem calx teratur super porfidum in pulverem subtilem, quem pulverem imbiberis bis, ter, quater in die, cum optimo oleo Tartari, factò eo modo quo dicitur in fine nostri, desiccando ad solem quousque dicta calx absorbuerit de dicto oleo 4. aut 5. partes, plus quam fuit ipsa calx, terendo semper super porfidum, ut dictum est, & in fine bene desiccetur calx, ut benè possit in pulverem redigi. Et quando fuerit bene pulverizata, ponatur in metreto cum collo longo. Ponatis de nostro menstruali fatenti, factò de duabus partibus vitrioli rubei, & una salis petrae, & prædictum menstruum prius destilletur septies, & bene rectificetur, separando feces terrestres in tantum, quod prædictum menstruale sit totum essentialle. Deinde lutetur benè metretum, & ponatur ad ignem cinerum, cum parvo igne carbonum, quousque videris materiam bullire & dissolvi. Deinde sic su-

pra cineres distilla, donec amiserit Menstruum, & materia fuerit frigida totaliter, cum frigidum fuerit, vas aperiat, & materia, quæ frigida est, ponatur in alio vase bene mundo, cum sua cappa bene lutata ad furnum supra cineres, & luto bene desiccato, fiat ignis paulatim in principio, quousque totam recipias aquam ipsius. Postea augeatur ignis, quousque materia bene fuerit desiccata, & Spiritus fœtentes sint ad cappam, & in receptorio jam exaltati. Et dum tale signum videbis apparere, dimittatur vas infrigidari; ignem minuendo. Et post refrigerationem vasis, extrahatur materia, & in pulverem subtilissimum redigatur super porfidum; ita quòd pulvis sit impalpabilis, qui ponatur in vase terreo bene cocto & bene vitreato. Et post ponatur super dictum pulverem de aqua communi bulliente, movendo semper cum baculo mundo materiam, usque materia fuerit spissa sicut sinapi. Et move dictam massam cum baculo, quousque videris apparere grana Mercurii è corpore, & quod vobis appareat quantitas magna prædicti Mercurii vivi, secundum quod posueris de corpore perfectò, id est, de Luna, & dum

dum habueris magnam quantitatem, interim projice desuper aquam bullientem; & tandem movendo, quoad tota materia resolvatur in materiam similem argento vivo vulgari, tollantur terrestres cum aqua frigida, & desiccetur per pannum: postea transeat per corium, & videbis mirabilia. Lullius in Clavicula. Cap. 2.

F I N I S.

100
The first of these is the
fact that the world is
not a uniform whole
but a collection of
many different parts
each of which has its
own special character
and its own special
history. This is the
fact which makes the
study of the world so
interesting and so
important.

101
The second of these is the
fact that the world is
not a static whole
but a dynamic whole
which is constantly
changing and
developing. This is the
fact which makes the
study of the world so
interesting and so
important.



Of the Dissimilitude
Of
Running Mercury.

BEfore I undertake to give you my opinion, about your question, I must crave leave to state it somewhat more clearly, by propounding it thus: *Whether all the Bodies, that in the shops, and among Chymists pass for true running Mercury's, are Homogeneous? Or, so much of one and the same nature, that the severall portions of such Mercury's are but numerically different?* Now to the question thus stated, the fear of seeming to maintaine a Paradox, by dissenting from the generality of Chymists, as well as Naturalists, (who are wont to employ indiscriminately all *Running Mercury's* not manifestly adulterated) will not keep me from returning a negative answer.

And though it were not over difficult

cult for me to give you the reasons of my opinion, drawn up into method, and referr severall instances I shall produce, some to the depuration of *Quicksilver*, some to the impregnation of it, some to the Coction, and others to two, or all these waies of altering it; yet I shall rather present you with them, by way of loose observations, because I presume that freedome will not be unacceptable to you, as it will allow me, to give you some few, but uncommon notices and hints about such noble subjects as prepar'd *Mercury's*.

1. In the *first* place then it may be observ'd, that a *Running Mercury* may be brought to differ from *common Quicksilver* by *Depuration*: for there are in most *Mercuries* either Recrementitious particles, or at least some loose adherencies, that are separable from the rest of the Body, and which being seperated, the *Mercury* becomes more Homogeneous or cleane than it was before this externall *Depuration*, (for so I call it to distinguish it from
another

another that is internall) that is usually made by grinding and washing *Mercury* very well with salt and Vinegar, (for which purpose I also sometimes use spirit of Wine) which one may not unfrequently see somewhat foul'd by what it carries off from the *Mercury*, which is also sometimes attempted to be purified by the more laborious way of distillation, which, though in some cases insufficient, (as I shall shew anon) is in some others very convenient; whereto some Artists add other probable meanes, tending to the same purpose. So that I do not wonder to find, that divers Philosophicall Spagirists themselves, before they proceed to more intimate preparations of *Mercury*, order it to be severall times previously incorporated and sublim'd with Acid *Salts* or *Sulphurs*, and then reviv'd with *Alcalies*: since without examining *their* grounds it may be said, according to Mechanicall Principles, that by diligent commixtures the *Mercury* is divided into exceedingly minute, if not invifible, Globules, or such like parts, and by this great comminution,
it

it acquires far more of surface than it had before, by which meanes a great multitude of separable parts come to be touch'd almost of every side by the Salts or Sulphurs, to which by this meanes, when the *Quicksilver* is driven from them in the revivification, 'tis probable, that very many of them sticke that were not superficial, when all these Globules made up but one Mercuriall Mass. And tis possible too, that the *Alkali's* employ'd to revive the *Quicksilver*, may help to tear of from it some of the feculent particles which the Chymists would desire to have it freed from. And here let me advertise you upon the by, that there is no necessity to have recourse to salt of *Tartar* or *Quicklime*, or such like *Alkali's* for the reviving of *Quicksilver*, and therefore when I would with ease obtaine a cleane and active *Mercury* for some purposes, I do not employ Acid and then Alcalizate salts, but mix very well common *Cinnabar* finely powdered with a double weight, or at least, an equall weight of filings of Iron, or Steel: for these being distill'd together

ther in a low Retort with a smart fire, the sulphur of the *Cinnabar* will fasten upon the filings, and let the *Mercury* come over faire and vivid, and perhaps somewhat impregnated with a martial vertue, upon whose score it may be better than if it had been prepared by meer Depuration.

2. And this leads me, to the mention of another way of diversifying *Mercury*, which is by *Impregnation*, either Corporeall, or Spirituall (if for distinction sake I may so call them.) But the *Impregnation* being a comprehensive way, divers particular methods may, after a manner, be referr'd to it: yet because the true grounds of such references are sometimes hard enough to be assign'd, at least in few words, I shall allow my selfe without scrupulously regarding them to proceed in my free observations.

3. The next thing then upon whose account a *Running Mercury* may come to differ from *Common Quicksilver*, is a spiritual *Impregnation*. By *Mercury Spiritually Impregnated*, I meane that
with

with which some subtle parts of another body are so intimately associated and united, that not only the additament will pass with the *Mercury*, when it is strain'd through Leather, (though that be the means by which Artists usually separate *Gold* it selfe from the *Mercury* wherewith it has been Amalgam'd) but will also continue with it after distillation, without hindering the *Mercury* from being vivid enough. I know there are many Chymists, especially, among the more cautious, that looke upon *Quicksilver* as so Heteroclitic a Minerall, that as no Body can fasten enough upon it, to alter it intrinsically, so it will not admit any other Body to be associated with it any thing intimately, or permanently. And indeed since we find that when *Gold* it selfe, with which of all bodies whatsoever *Mercury* is beleev'd to have the greatest sympathy, may yet be separated from it by straining an *Amalgame* of those two metals through Leather, which will transmit the *Quicksilver*, and retaine the *Gold*; and if such an *Amalgame* be distill'd with a comperent fire,

fire, the *Mercury* will ascend, and leave all the *Gold* behind in the Retort; since *Mercury* I say, is so separable from *Gold* it selfe, it may seem improbable, that it should be more intimately associated with any other bodies: but these arguments, though specious, do not I confesse convince me, who must not deny, but that the Corpuscles of some minerall Bodies may be so well commixt with *Quicksilver*, as to pass with it through the Pores of Leather, and who have found by tryall purposely made (and elsewhere related) that *Quicksilver* being in a convenient proportion Amalgam'd with *Tinn*, or with *Lead*, and distill'd with a competent fire, will manifestly bring over with it some of the associated metall, inso-much that not only I have found a notable increase in the weight of the distill'd *Quicksilver*, but it would both leave a taile, as they call it, behind it, when it moved upon a sloping glass, and (which was more) when the sluggish *Mercury* had rested a while, it would appeare covered over, with a kind of scum, made of the

Emerging

Emerging Corpuscles of the *Tin*, or *Lead*, either of which, especially the former, is a metall lighter in *Specie* than *Quicksilver*. Hence it appears, that *Mercury* may be so strictly united to a not despicable proportion of a gross and ponderous body, and of an ignobler kind as to carry it along with it selfe in distillation, which by this appears not to be near so certain a way, as some learned Chymists think it, to try whether *Mercury* be pure in all adulterating mixtures, and to free it from them, if it had any before. But the chiefe use I will make of this Experiment is this, that since we see that sometimes *Mercury* do's not refuse even corporal Impregnations, (as for distinction sake I call those lately recited) it ought not to appeare incredible, that it may in some cases admit spirituall Impregnations, and so intimately associate with it selfe some of the finer parts of certaine metalls and mineralls, as not to part with them, though they be distill'd, and afterwards perhaps severall times wash'd. This brings into my mind, that I had once a distill'd

still'd *Mercury* made by an Impregnation of common *Mercury*, a drop or Globule of which, being evaporated from a thin piece of Silver, not only seem'd to have somewhat penetrated it, but (as I expected) left upon it a rugged substance apparently lighter than the surface of the piece, and of a colour very neare that of *Gold*, from whose nature perhaps it was very remote: but that common *Mercury* may indeed be spiritually impregnated, I have been perswaded by divers effects, that I have tryed of such Impregnations, and I acknowledge to you, that most of the uncommon *Mercuries*, that I am now proceeding to tell you of, have been prepar'd after some such manner.

4. Another thing, wherein a *Mercury* may differ from common *Quick-silver*, is a facility to *Amalgame with Gold*: for 'tis known to Guilders, Goldsmiths, and others, that are vers'd in such Experiments, that to make *Amalgams* with *Gold* and *Mercury*,

cury, 'tis usuall enough to take six parts of the latter to one of the former, and some take eight or more. Nor is so great a proportion of *Mercury* wont to keep them from thinking it requisite to make both it and the *Gold* separably, and considerably hot to facilitate their commixture, but I have divers times had spiritually impregnated *Mercuries* with but two parts, of which I would presently make an Amalgame with one part of the *Calx*, or leaves of *Gold*, and that without any other externall heat, than that of the palme of my Hand. Nay sometimes for tryall sake, I have employed but one part of *Quicksilver* to make in the palme of my Hand a mixture, wherein the *Gold* was so far from appearing, that the colour of the *Quicksilver* was not sensibly so much as impair'd.

5. Another difference between some *Mercuries* and those that are vulgar, is, that these being put to *Calx* of *Gold*, though one do at length bring them to mix, (for it is not so easily done as men are wont to presume) yet

yet they will not disclose any sensible heat, but the mixture, as each of the incorporated Ingredients was, will to the touch be cold: but though I know there are many learned Chymists that looke upon incalescent *Mercuries*, that is, such as will grow hot upon their mixing with *Gold*, as Chymical *non-entia*, or Chymæra's, yet they are not competent Judges of the possibility of things. For I have more than once, or a few times, both alone, and in the presence of some curious persons, found and evinc'd, that a distill'd *Mercury* may be so animated, that a single drachm of it, or perhaps a far less quantity, being mix'd barely with my finger, with as much, or perchance halfe as much, *Calx of Gold*, would presently conceive, not only a sensible, but a very considerable heat: insomuch that sometimes it would prove offensive to the palme of my Hand, wherein I made the mixture. Divers *Phænomena* of this Experiment may be seen in the Authors little Tract of the incalescence of *Quicksilver with Gold*, now extant in the *Philosophical Transactions*. Numb. 122. And I re-

P member

member that once being to convince a very eminent Chymist, that there were such *Mercuries* as I have been speaking of, I tooke a remnant of a certaine *Quicksilver*, which I intend never to make againe, (and of which for the sake of Mankind, I resolve not to teach the preparation) of whose disposition to incallescence I had such an opinion, that though we had no *Calx*, nor so much as filings of *Gold*, but only such pieces as he could grossly prepare with a hammer and a paire of sissers, I ventured to put my Mercury to them in a glass Mortar, and yet notwithstanding the thickness and closeness of the beaten metall, and the coldness of the Vessell, the Mercury to the Artists wonder penetrated the *Gold*, and grew manifestly hot with it. And this faculty of our *Quicksilver* was not a transient and easily vanishing one, for I had already kept the Mercury by me, for severall years. The *incallescens* *Mercuries* hitherto mentioned were animated by tedious, and laborious operations, but if I had desired only to convince gaine-sayers, I could have
done

done it by a very much shorter way : for though this sort of impregnated *Mercury's* be many degrees inferior to the forementioned animated *Mercuries* , yet as to incallescence with *Gold* I know by experience a way which is indeed hard to hit , and requires a dexterous Artist, but which, when it succeeds a right , will in an hour, and perhaps a less time, qualify *Mercury* to grow presently hot with *Gold*.

6. When an Animated *Mercury* is by due Impregnation qualified to Amalgamate readily and intimately with *Gold*, and penetrated so as presently to grow hot with it , it is not much to be admir'd , that it should also differ from common *Mercury*, in the being able to carry up with it part of the *Gold* wherewith it was so strictly associated. I know that many learned Men , and among them divers Chymists themselves , do not thinke it credible , that at least Corporall *Gold* should be volatilized by *Quick-silver*. And indeed that which is common may be many times distill'd from

Gold, without carrying up any of it; but this ought not to conclude against such spiritually impregnated *Mercuries*, as I lately mention'd: for with a very small quantity of one of them I have sometimes elevated so much *Calx* of *Gold*, that the inside and necke of the Retort were richly guilt by the adherent particles of that metall, which would sometimes sticke so close, as not to be without difficulty separated from the glass; and I remember too, that having with one of these noble *Mercuries* Amalgam'd about halfe its weight at most (if I mistake not) of *Calx* of *Gold*, though it did not guild the inside of the glass, yet I found as I expected, that the distill'd *Mercury* was manifestly encreas'd in weight, as well as somewhat chang'd in colour and consistence; which Experiment may be added to those, that I formerly mention'd, to prove that *Quicksilver* (duely prepar'd) may be corporally impregnated.

7. In the *Amalgames* made of one of these spiritually impregnated *Mercuries* with *Calx* of *Gold*, I have sometimes

times observ'd a thing, that argues such *Mercuries* to be differing from common *Quicksilver*: of whose *Amalgames* with *Gold* such an effect has never (that I know) been taken notice of. The *Phenomenon* I meane was this, That by distilling one of those subtle *Amalgames* in a Retort, a good part of the bottom of the Vessell, which I have yet by me, was left adorned with a very lovely colour, almost like that of *Turrois* Stone, inclining towards the colour of *Gold*, and somewhat changeable, and also so closely fastned to the Glass, that it seems to have penetrated into it, though this beautifull stain were left by but a very small quantity of the *Amalgame*, and though this mixture were distill'd but in a moderate fire, since 'twas in a sand furnace. Nor is this the only Experiment of this kind, that I would alledge, since I elsewhere mention an *Amalgame* of *Gold* with an animated *Mercury*, which being long decocted, when at length by an excessive fire unskilfully administred the vessell was unluckily broken, left the lower part of the glass permanently ting'd with a

pure and transparent red, that seem'd to me to emulate that of a not common *Rubie*.

8. Another difference I found between ordinary *Quicksilver* and spiritually impregnated *Mercuries*, that will perhaps somewhat surprize you. And it is, that though one would expect that *Amalgames* made with *Mercuries* so penetrant and so dispos'd to adhere closely to *Gold*, should make with it *Amalgames* far more easy than those made with ordinary *Quicksilver* to be turn'd into red Precipitate, yet I found the quite contrary upon tryall. For whereas Chymists are wont to mention about six weekes as the usuall time, wherein *Mercury* may be precipitated even *per se*, that is, without additament, and allow but a shorter time to make this precipitation, when 'tis Amalgam'd with *Gold*, (whereby some of it is detain'd, and all more expos'd to the action of the fire) I have had the Curiosity to keep an animated *Mercury* Amalgam'd with about a third part of its weight of fine *Gold* above twice six weekes,

weekes, without having so much as a graine or two of precipitate (perhaps not halfe so much) that I could perceive, though the *Mercury* grew hot with the *Gold* at their being mingled, and though the mixture were purposely kept in a good heat capable to make *Quicksilver* circulate; nor did I content my selfe with one tryall, nor with one sort of animated *Mercury*, but in above five or six months I obtained not one graine (that I could discerne) of Precipitate, though the heat was so strong, as to carry up many parts of the *Quicksilver* and of the *Gold* with it, to the top of the glasses; nay in one of them (which was a somewhat odd case) the fire was so violent, that the *Hermetically* seal'd glasses beginning to melt, the spirituons matter included in it was so forcibly expanded, as to stretch the weaker side of the glass, and give it as it were a bunch, yet without breaking it, as I can shew you in the glass it selfe, that I have yet entire by me. Nor do six months make the longest terme, that the obstinacy of my curiosity has made me keep *Gold*

in decoction with animated *Mercuries* without obtaining a red powder or *Precipitate*, though in the meane time there were produc'd very pretty vegetations, and sometimes, which is far more considerable, odd changes of colours, about which it is not here necessary to entertaine you. The maine drift of this observation being to give you notice, that as far as I have yet tryed, the more subtle and richly impregnated *Mercuries* are far less apt to afford *Precipitates* with *Gold* than common *Quicksilver* is. As if that disposition to be calcin'd, (as the Chymists are pleased to speake) or turn'd into powder, required the presence of the incrementitious or more separable part of *Quicksilver*, that a Chymist would perhaps call it *Sulphur*, which was a discovery I could willingly enough have miss'd. For I confess I had some hope, as well as intention, to try whether a *Precipitate* made with *Gold* and some of these noble and richly impregnated *Mercuries* would not prove a nobler medicine than *Precipitates* made with *Gold*, and only common *Mereury*:
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though even of some of these, when dexterously prepar'd and kept their due time in decoction, experience invited me to have no slight opinion, especially, if they be exhibited in a just dose, and accompanied with a proper additament, by which they may be kept from raising any salivation, and have their operation either altogether or almost totally determin'd downwards.

9. The last difference I shall observe between some distill'd *Mercuries* and common *Quicksilver*, shall be their *Inequality in point of specifick gravity*. I know you will thinke this a Paradox, but I can tell you, that I had once the opportunity to examine *Hydrostatically* a noble *Mercury*, for the impregnating whereof neither corporall *Gold* nor *Silver* was employ'd, and yet having carefully weigh'd this *Quicksilver* in water, according to the method I elsewhere teach, in the presence of a famous and very heedfull *Virtuoso*, I found it, as I had foretold, not only manifestly, but very considerably heavier in *Specie*
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(that is, *bulke for bulke*) than common *Quicksilver* , though this *Mercury* had been severall times distill'd, and by other waies depurated, which to me seem'd to argue, that even spirituall or volatile *Gold* (for no visible *Gold* was employ'd, and no metall but *Gold* is so heavy as *Quicksilver*) is able to increase the specifick gravity of *Mercury* it selfe, which of all the Bodies we know, is exceeded or equal'd in that quality but by one alone; and the ponderousness of our lately mentioned *Mercury* seems to me the more wonderfull, because having by the same method *Hydrostatically* examin'd a *Mercury*, made after a strange way, (without common *Mercury*) I found it scarce at all to differ in gravity from common *Quicksilver*, since it did not weigh full fourteen times as much as common water of the same bulke.

But here I shall observe to you upon the by, that 'tis not a certaine consequence, to inferr, that the heavier the *Mercury* is, the more fixt it must be: for I remember that having been once
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so unadvis'd as to comply with the earnest solicitations of an inquisitive Gentleman, that afterward behaved himselfe very ungratefully and unworthily to me, I gave him instructions how to make an animated Mercury, which I look'd upon as very much of the like nature to the ponderous one, I have been speaking of, but less tedious, and far less difficult to be prepar'd, and whiles he found, he needed my renewed directions according as new difficulties occur'd to him, he gave me from time to time an account of his progress, and when he was advanc'd far in the process, he inform'd me, amongst other things, that following my direction in purifying and animating his *Quicksilver*, he found it so alter'd and subtiliz'd, that he would distill it in less than halfe the time he had formerly employ'd to drive it over, with the like fire and vessells.

This is what I thought fit to say at present, about the differences between common *Quicksilver* and prepar'd (but yet running) *Mercuries*.
And

And yet I am content to add two or three advertisements, for which, and especially for the first of them, you will perhaps thanke me, if ever you should vigorously prosecute in a Spagiricall way, the more noble sort of Mercuriall Experiments.

In the first place then, I shall observe to you, that whatever some learned Chymists, and others teach to the contrary, it is matter of fact, that *Mercuries* may be animated or spiritually impregnated by more waies than one, (not to say, by more than a few) so as to penetrate *Gold* very powerfully, and grow hot with it; and it seems to me very probable, upon grounds not meerly notionall, that the differing wayes that are employ'd to prepare these animated *Mercuries*, by impregnating them with this, or that Minerall, or metall, may much diversify their qualities and operations, according to the respective natures of the bodies they are impregnated with. Nay though there seem so great a distance between *Quicksilver* and vegetable substances,
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yet I have seen a Mercury, that was prepar'd by the help of Vegetables without metalls or mineralls, which was very different from common *Quicksilver*, by being more noble than it.

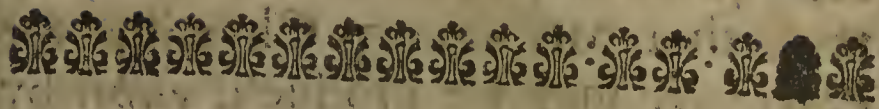
The second thing I am to acquaint you with, is, that as divers bodies and methods may be employ'd in the preparation of noble *Mercuries*, (as I have newly observ'd,) so it seems very probable, that the common *Mercuries* so prepar'd may have differing, as well as noble qualities and uses, not only in respect of *Alchymy*, but of *Medicine*; as being fitted to have potent operations, as well upon humane bodies, as the more stubborn ones of Metalls and Mineralls. I am not indeed at all forward to recommend the needless use of Mercuriall Medicines, of which we may too often see bad effects, if they be not as well prudently and cautiously given, as faithfully and skilfully prepar'd: but since we see that in spite of *Helmont*, very many learned and experienced Physitians allow themselves to employ, frequently enough, even
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the vulgar preparations of common Mercury, some of which prove indeed oftentimes in some stubborn diseases far more efficacious than ordinary medicines, I see not why we may not hope for greater and more innocent effects from a Mercury well purifyed and impregnated with the Sulphur and finer parts of such bodies, as volatile Gold, or Venus, or Mars, or Antimony &c. And though, as I lately told you, I found such animated Mercuries far more indispos'd than common Quicksilver, to make a Precipitate with Corporall Gold, yet this need not hinder, but that divers other preparations may be made, as well with impregnated, as with vulgar Mercury: such as are Turbith Minerall, the white Precipitate that purges downwards, Mercurius dulcis, Pills of Crude Mercury made up with fit ingredients. (as in those that are by some called the blew and the blacke Pill) and especially the Cinnabar made by subliming Quicksilver and Sulphur, into a purely red substance, which though wont to be employed chiefly by Painters, ought not perhaps to be
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neglected by Physicians, since even in ordinary *Cinnabar* the vulgar *Mercury* is so bridled by the common *Sulphur*, that unless too frequently given without pauses, or in an indiscreet dose, it has not been usually found to salivate, yet does often lye not idle nor useless in the body; so that it may bee well worth trying, whether a noble *Cinnabar* may not be obtained by substituting animated *Mercury* for vulgar, especially if instead of common *Sulphur* one should employ that of *Antimony*, or of *Antimony* and *Vitriol*, which I have elsewhere shewn to make.

The third and last advertisement I will give you, shall be, that you are not hastily to conclude, that a *Mercury* that has been carefully depurated and impregnated, has not been well prepared, if you find it not readily to elevate corporall *Gold*, as it may seem by the past discourse that most of the animated *Mercury's* I have mention'd did. For though it be true, that I have had some *Mercuries* fitted to penetrate *Gold* so far, and mix with it so closely,
that

that it would quickly upon distillation visibly carry up some of that ponderous metall with it, yet so much is not to be expected from all *Mercuries* that may lay claim to the title of *Animated* or *Noble*. For I have found that some even of these, may require a strong decoction to incorporate them intimately with *Gold*; and I remember that once for tryalls sake I made *Mercury*, which upon bare distillation would not at all colour the glass; I made (I say) this *Mercury*, by decocting or circulating it with the *Gold* for ten dayes or a fortnight, unite so closely with the metall, that it would afterwards elevate enough of it to guild the inside of the glass; and by a much longer decoction I have sometimes had the *Gold* lodg'd copiously in the upper part, and even in the necke of considerably tall Glass Eggs, *Hermetically* seal'd, one or two of which I can yet shew you.



The V. Part.

Of the Producibleness of Phlegme or water.

○ F the severall substances that Chymists obtaine by the fire from mixt bodies, that which they call *Phlegme* or *Water*, and would have Men looke upon as *meer Water*, separated by a preceding *Analysis*, seems to the *Helmontians*, and diverse other modern Artists, to bid the fairest for the Title of *Elementary* and *Primordially*. Wherefore it will now be fit to consider, whether, about that also, we may not justly retaine some doubts, and rationally suspect, that all that they call the *phlegme* of body's, was not in the forme of *Elementary* simple water, preexistent in the body, whence 'tis obtain'd: but that even
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such portions of matter, as many of those that pass among Chymists for *Phlegmes*, may be produc'd either by the operation of the fire, or by other wayes.

In order to the enquiry, it will be fit to premise something against the presum'd simplicity and Homogeneity of the liquors, whereto the Spagirists give, in common, the Name of *Phlegm*; that in case some of the produced liquors we speake of shall be deny'd to be precisely of an Elementary nature, it may appeare that that ought not to hinder us from allowing them the name of *Phlegm*, provided that they be not remoter from simplicity, than those to which Chymists grant that Appellation.

And first, I consider, that besides those Quality's that are common with water to diverse other liquors confessedly not simple, as transparency, want of colour, apiness to be imbibed by most sorts of Vegetable and Animall Substances: the two Qualities, upon whose account Chymists are wont
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to call a body *Phlegme* or *Water*, are, it's appearing to them *Insipid*, and its being of a *Volatile* and fugitive nature.

I further consider, that not only divers of those liquors that pass for *Phlegme*, will yeild a taste sensible enough to him that will hold them with attention of mind, for a competent time, in his mouth, but that the *Criterion* of liquors by the Taste is nothing near so certaine as many thinke: For, not to mention, that 'tis plaine, that some kinds of doggs, as *Setters*, *Spaniells*, and *Blood-hounds* take notice of many things by their odours, that we Men have no perception of by our smelling, which may argue, that our Senses may not be moved with objects that would affect them, if they were of a more delicate contexture; not to mention this (I say) 'tis plaine that the subtlety of the sence of tasting differs among Men themselves. And those that drinke nothing but water, will often tell us of a great Disparity betwixt common water, wherein other Men find not

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any.

any. And I remember, that when once I did, though but for some Months, confine my selfe to drinke water, I could distinguish the Limpid waters of differing places, almost as manifestly as I now distinguish Beeres, which after I fell againe to drinke Wine and other liquors, I ceas'd to be able to do.

The Consideration of *Quicksilver* may, methinks, let us see, that 'tis possible for a gross and fluid body, that is far from Elementary *Water*, to be insipid. For *Quicksilver* is without question a fluid, and at least in reference to some bodies, *Gald*, *Silver*, and some others, a liquor; since it soaks into their pores, and softens the bodies. The same *Quicksilver* may also serve to shew, by its disposition to fly away in the fire, that Volatility, even in conjunction with insipidness, is no certaine mark of an Elementary or simple, nor consequently of a Primordial body. And indeed since Volatility depends mainly upon the extraordinary minuteness of the particles whereof a body consists, and

and on their being incoherent, and of shapes fitted for Motion; this quality may be acquired by so many differing wayes, and be found in bodies otherwise of such differing Natures, that unless it be found associated with the other qualities proper to *Phlegme*, it will be but an unsure Argument, to prove the body that it belongs to, to be Elementary, and not to have been by composition, division, or transposition *produc'd*.

If it be true as the *Cartesians* will have it, that *water* consists of particles, that like little *Eeles* are long and extreamely slender, and consequently flexible; I see not any possibility, that the various action of the fire, upon the Minute parts of a body, and that which it may cause, the corpuscles of one body to have upon those of another, may produce *water*, that did not in the form of water preexist in the body that affords it: for it seems to me possible enough, that the particles whereof a corporeal Mass is made up, may have

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such

such shapes, Sizes, & contextures, that by the various agitation which the parvading corpuscles of the fire may produce amongst them, whatever edges and points they had before, may by mutual attrition of the Corpuscles be worn off, and by the same means, so much of the substance may be worne away, that what remains, cannot but be very flexible, and by all these qualifications become fit to make a particle of water. As a bar of *Iron* may by divers strokes of the wedge and Hammer skilfully employ'd, be divided into longe and slender parts, whose edges and points being blunted, they may be reduced into slender, and every way flexible Wires. But not to build on speculations, let us proceed to some experiments, which afford *Phænomena* that seem favourable to our *Hypothesis*.

Amongst the bodies about which Chymistry is conversant, those that seem to be the most indispos'd to be turned into *water*, are the Metalline, and Mineralls ones: so that if it can be made appear, that any of this sort can

can be changed , into an Aqueous liquor, twill make it highly probable, that Aqueous Liquors may be by Chymical operations *produced*, especially in vegetable and Animal bodies, which seem far more susceptible of such a change , than the stubborne subjects of the Mineral Kingdome. And since *Quicksilver* is by many learned Men, as well Chymists as others, lookt upon as one of the few most indestructible bodies in Nature, and by its great ponderousness, in which it exceed's all the known bodies of the world save one , is so much the more remote from such a liquor as *water* , that has not the sixteenth part of its specifick weight ; If *Quick-silver* it selfe can in great part be turned into an Aqueous liquor, it will not a little favour the Doctrine proposed in these Notes ; for which reason I shall subjoyn the ensuing story.

Relating to a very ingenious and sober Physitian of my Acquaintance what had befalln me in distilling *Mercury*, from whence I once obtain'd a *water* without additament, without

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being able to make the like Experiment afterwards succeed, he assured me that he and a friend of his, had some years past provided a very large *Dutch* Retort of good Earth, furnished with a Pipe of about a foot long, to cast in the *Mercury* at, and that having by little and little conveyed through that pipe a pound of *Quick-silver* into the candent Retort, they obtained four ounces of *Water*, and lost in spite of their care two ounces of matter (whatever it were,) the remaining part of the pound having been elevated in the forme of *Mercury*. And when I suggested, that perhaps the *Water* that came over was afforded by the aqueous particles of the Earthen Retort it selfe, he replied, that, to prevent their being imposed on, they had been carefull not to put on the Receiver, till the Retort had been made thoroughly glowing hot, and that this liquor was far from common *Water*, he thought to be past doubt, by that which follows. For I having acquainted him with an odd tryall or two, I had made with *Mercuriall Water*, and asked him, whe-

whether he found the like effects from his, he told me, that his friend and he poured both their distilled *Mercury* and their *Water* into a kind of *China* cup, and though it were in *June*, left it open in a Garret for two or three dayes, upon a Presumption his friend had that this Mercuriall *Water* thus ordered would turne a good part of the *Quicksilver* into it's own nature, and so multiply it selfe upon it. But when they came to visit their Cup againe, they were much surprized to find their *Water* all gone, and that the greatest part thereof was turn'd againe into *Mercury*, which they concluded from this, that they miss'd upon the ballance but about halfe an ounce of the whole matter; which (halfe ounce) they supposed to have been lost by evaporation; the other three ounces and a halfe being found in the encreased weight of the *Mercury*.

The mention I have made of *Quicksilver*, puts me in mind of an Argument *ad hominem*, that may deserve to be considered, by the chiefe sect
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of modern Chymists, the *Helmontians*; for if it be true which their master teaches, that by his Liquor *Alkabeſt*, not only *Quicksilver*, but all other tangible bodies, may be reduc'd into insipid Water, just like Rain Water, I may be allowed to infer, that *Water* may be produc'd, since salt and Sulphur themselves may be turned into *Water*. I know the *Helmontians* may answer, that this is not so much a production, as a reduction, since all things consisting originally of *water*, the *Alkabeſt* does but deprive it of the disguises, that seminal Principles put it into, to make it appear, under the form of *Gold*, *Quicksilver*, *Plants*, *Animals* &c. But this Answer may be elsewhere further examined: for the present, it may perhaps be sufficient to reply, that even by this Answer 'tis granted to appear by Experiment, that *water* has been copiously produc'd out of Mineral bodies, but it has not yet been made appear, that those bodies were produc'd out of *water*.

But this is not all, nor perhaps the
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Principall thing I have to say in favour of the opinion pleaded for in these Notes. For supposing bodies by being reduc'd, by the *Alkabeſt* and the fire, into an insipid Liquor, were really reduc'd into *water*, yet the *Helmontians* would not fully satisfy me. For *Helmont* relates, that by abstracting his immortal Liquor from stones, or such kinds of bodies, he turns them into salt equiponderant to the Concrete; which Salt by further operations he reduces, as he supposes; into Elementary water. Since then he stops not at salt, but goes to a further transmutation, and concludes, that a Stone doth not consist of salt, because that salt may, by further operations, be turned into insipid *water*; he must give me leave, on the same ground to argue, that insipid *water* is not the first matter of bodies, since by a further operation of the fire, that liquor it selfe may be, at least in great part, turned into *Earth*. For I elsewhere relate some Experiments of my own and a friends, in which cleare *water*, divers times very slowly distilled out of clear glass bodies, left every time

a terrestriall powder at the bottom: as if (in case *water* be so *Homogeneous* a substance as is supposed,) the whole body of the *water* might, by reiterated Distillations, without violence of the fire, be reduced into *Earth*; whereof I remember in the last tryall of mine, I had enough to cover the bottom of a large Cucurbit, out of which the Distillations had been made.

And on this occasion, I shall add a Tryall, which seems to argue, that without the help of often repeated distillations in tall Cucurbites, cleare *water* it selfe may, by the operation of the fire, be chang'd into another Body.

We tooke then very pure and limpid *water*, which had by our *Pneumatick* Engine been carefully freed from the Aeriall particles, that are wont to be harboured in the Pores of that liquor: This in a new bolt-head of such a size, that the matter might have roome to play and circulate, we seal'd up *Hermetically*, and placing

placing the vessell in a digestive Furnace, we left it there above a yeare, and observ'd, as we expected, that after it had continued for a good while, there began to forme themselves in the water little concretions heavier than it, which in process of time encreased in magnitude, and, as we thought, in number, making a kind of *Terra foliata*, that consisted of a multitude of little thin filmes or scales, (like those of the smaller sort of Fishes) which, when the glass was shaken in an enlightned place, were copiously dispers'd through the body of the Liquor, and appear'd variously and vividly colour'd, being some of them almost as big, as spangles, and more glittering; and when the agitation ceas'd, they presently fell to the bottom, which they cover'd in the forme of a *Terra Foliata*; by their subsidence manifesting themselves to be notably heavier *in specie* than the water they had been form'd of. And the longer the glass was kept in the digestive Furnace, the more of this fine Terrestriall substance was produc'd: And least the effect should be ascribed

ascribed to the abstraction of the *Aire* from the *water*, handled as is before related, I shall add, that we produc'd the like substance, though, as it seem'd, not so copiously, after the like manner, in *Water*, that had not at all been freed from *Aire*.

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The VI. Part.

Of the Producibleness of Earth.

O Fall the substances obtainable from mixt bodies, that which to Persons preposses'd with *Helmontian* opinions may seem the most simple, elementary, and unchangeable, is, that which they call *Earth* or *Terra damnata*: because there is suppos'd to be no doubt, but that the calcining or incinerating violence of the fire must not only have driven away the *Mercurial* and other volatile parts, but must also have quite burnt out the *Sulphurs*, which oftentimes are more fixt than the rest; as the water on the other side must have dissolv'd away all the *Alkali* or fixt salt.

This *Ratio*cination I confess, is very specious and probable, but yet not so satisfactory, but that a *Sceptick* may retaine not irrationall doubts about

bout the cogency of it, upon such considerations as I am now going to propose.

And I will begin with considering, that, whereas the things wherein this suppos'd simplicity, and unchangeableness of the Earthy part of mixt Bodies, is founded, are these Three: its not dissolving in water; its not affecting the Taste; and its not having flowne away from the incinerated body, that afforded it; it may with probability be doubted, whether any of these or all of them put together, do necessarily evince what Chymists pretend they do.

And in the first place according to the different constitutions of certain sorts of bodies, I thinke it fit to make a distinction between the dry and heavy parts, that remaine after a Body has been expos'd to the violence of the fire, and if need be, freed from its salt as much as it can be, by the affusion of water. For 'tis evident, that in some Bodies, especially of a Metalline nature, the fire, that makes
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that which they call calcination, do's not operate as it do's in the burning of Vegetables. For, besides that sometimes almost (and sometimes more than almost) the whole weight of a minerall is to be found in that which they call it's *Calx*, and is manifest in the Calcination of *Lead* and *Tinn per se* (if skilfully perform'd,) the *Calx* is in great part reducible sometimes into a body of the same nature with that which afforded it, and sometimes into some other Body, very far from being Elementary: as is manifest *partly* in the reduction of *Minium*, (which is *Calx of Lead* made *per se*) which, as to the greatest part of it, we have more than once, by the bare way of ordering the fire, reduc'd in a very short time, and without additaments, into malleable *Lead*; and *partly* in the *Calces* or (as they also speake) *Ashes* of *Antimony*, which by bare fusion are easily reduc'd into glass, whence we have sometimes obtain'd an *Antimonial Regulus*. So that 'tis manifest, that there is a great deal of difference, *between* the *Ashes* (taking that word in a large sence) of *Metalls*, and of

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some Mineralls, where almost the whole Body is by the fire converted into a dry and heavy powder, *and* the Ashes of incinerated Vegetables, who usually leave but a little quantity of *Earth* behind them, in comparison of the matter which the violence of the fire hath driven away.

But setting aside the above-mention'd Metalline *Calces*, which without question remaine compounded Bodies, if metalls themselves be so; and to forbear examining, whether they be not further compounded with Corpuscles of the fire, or fuel, that are embodied with them: I consider, that the Qualities which make *other* Ashes pass for Elementary *Earth*, may be produc'd in portions of matter that are not simple, either by composition or change of texture.

I have elsewhere occasion to take notice of Bodies, which though when they are single, they will easily dissolve in water, yet the result of them will not: And you may find instances of this kind, among the *Magisteries*, as
Chymists

Chymists call them, made of severall Bodies, by precipitating their solutions (made in acid liquors) with oyl of *Tartar per deliquium*.

From oyle of Vitriol and spirit of Wine, though both most readily dissoluble in water, we have by bare digestion and distillation, obtained a pretty quantity of a substance, that we found not to dissolve in water, and which seemed to be insipid and fixt enough.

There are Stones, some more and some less pretious which though I could by the help of the fire deprive of their colour, and bring to a white powder, yet it did not appeare to me, that they were really calcin'd, or would in water yeild any salt: so that if these Stones be compounded bodies, as Spagirists tell us they are, we see that there may be other Corpuscles besides metalline ones, which though reduc'd by the help of the fire to a white powder insipid and not dissoluble in water, are yet remote enough from an Elementary nature.

But I need seek no further, for instances of this kind, since Spagirists themselves teach us, that the Ashes of Wood may by the Violence of the fire, be turn'd into glass; which being a body compos'd of the Earthy and Saline part of the Ashes (for they tell us, that *Earth*. separated from the Salt will never be vitrified) must be according to their own confession a compounded Body: which being at last made by the utmost violence of the fire, must be fix'd, indissoluble in water, and consequently insipid. And without taking this Vitrification upon the Chymists authority, 'tis manifest, that in glass made the common way, there is a great deal of *Borellia*, *Sal-Alkali*, or other Lixivate Salt mixt with the Sand: as is evident, not only because Artificers find the salt needfull to dissolve the Sand, and bring it to fusion, but because the Glass uses to weigh very much more, sometimes (as an Ingenious Master of a Glass-House answered me) thirty, or forty pound in an hundred, than the Sand that was put in.

I shall add, that, since Chymists ascribe all *Odours* to Sulphur, I may reasonably conclude against them, that in spite of all the violent fire, which is required to the making common glass, there is store of Sulphur, as well as salt in it. For I have often tryed that by barely rubbing two large pieces of glass, one against another, there would quickly be produc'd a strong offensive smell. And yet Glass which thus appeares to be not only a Compounded, but a Decomposed Body, since the Sand or *Cugali* (as the *Venetian* Glasmen call their Pebbles) or other Stones being themselves mixt Bodies, are further compounded with the Salts that dissolve them: *Glass*, I say, is a Body that manifestly possesses all these three qualities, which Chymists require in their *Earth*, being tasteless, indissoluble in the Water, and fixed in the fire. And if Ashes alone be (as Chymists teach us they are) capable of vitrification (and indeed an inquisitive Owner of a Glass-House answered me, that once, if he much misremembred not, made, but not ea-

fily, glafs of Afhes alone without Sand;) how are we fure but that in common Afhes, freed the common way, from their fixt falt, that which is called the fimple *Earth*, may not be a body compounded of two or more fubftances, which by their coalition, and new Texture produc'd by the action of the fire, have been brought to a kind of Vitrification, or otherwife have acquired the few obvious Qualities, that Chymifts are wont to thinke fufficient to give a Production of the fire, the name of *Earth*.

Tis obvious to obferve, that divers Bodies, when they come to be of fenfible bulke, will finke in Liquors, in which their Corpufcles would freely swim, if fo many of them did not ftrike together. As of Salt and Sugar, the Lumps, and even the graines, whiles they remaine fuch, will fall to the bottom of Water, in which when they are difpers'd into minute and invifible Corpufcles, they will eafily swim. And I have
obferv'd,

observ'd, that in stopt glasses some Salts, and other Bodies, that for many Months remain'd undistinguish'd in the Liquors that harbour'd them, would in tract of time, have Conventions made of their Particles, that would then subside, and be no more carry'd up and down by the particles of the Liquor. And I see no impossibility, that somewhat of this kind may happen to the particles, whereof water consists: for if some of these, by frequent occussions and Attritions come to apply themselves to one another, so as to have a fuller, and more immediate contact than formerly, and to be intangled among themselves, and perhaps also to exclude some very thin and subtile Aire, that may be suspected to lurke about them, and contribute to their sustentation; if I say, this Union or strict Adhesion of Aqueous Corpuscles, shall happen to be made, the Aggregates or Clusters, though as to sense, but very small, may be too great and unweildy to be any longer, parts of water, but may subside in that Liquor; and if their Union or Adhesion be strict enough,

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enough, they will upon the same account be unfit to be carryed up in the forme of Vapours, and exhalations by Heat, and so may be like *Earth*, fix'd in the Fire, as well as not dissoluble in water.

I have sometimes also had a suspicion, that the production of an Earthy substance in water, may be furthered by the particles of fire, that are employ'd to make it circulate; and that of those Igneous particles, which, as I am apt to think, pervade the glass, some of the grosser, or rather the less subtile, may in their passage fasten themselves to some aqueous particles, fitted to adhere to them, and may with these begin to make some invisible Concretions, to which afterwards other congruous particles may little by little sticke in their passage, and so at length compose sensible Aggregates of powder: which may be illustrated by what happens in the precipitation of *Quick-silver* without addition, where the Mercurial particles being associated by, and probably with some of those
of

of the fire, begin to forme Concre-
tions, at first very minute, which af-
terwards encrease more and more, by
the accession of other adhering parti-
cles, till all the *Mercury*, or the grea-
test part of it be reduc'd, from a flu-
id Body to a red powder. And per-
haps it may countenance my Conje-
cture, about the production of an *Ear-
thy* substance, by a briske concurrence
of the particles of fire, if I add, that
though I have kept high rectified spi-
rit of Wine for above a year toge-
ther *Hermetically* seal'd, and for the
most part of that time in a Digestive
Furnace, without finding any *Earthy*
Residence, yet, when I ordered a Bolt-
head, that, though it were *Hermeti-
cally* seal'd, the *Alcool* of Wine that
was put into it might be boiled with-
out breaking the Glass, I found that
in a short time this liquor would af-
ford a not inconsiderable quantity of
such a subsiding Talcky substance, as
I obtain'd from the water formerly
mention'd. But these things I need
propose, but as illustrations that may
somewhat help you, to conceive how
Water may be turn'd into *Earth*. For,
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whether it be by these, or any other waies, that the thing is performed, yet since the Experiment formerly recited, that Water by frequent Cohabitations may be more and more turn'd into *Earth*, argues the matter of fact, our not being able to explicate the manner, does not hinder the thing from being true; nor the Argument we build on it from being good: since even Water, to which by some operations of the fire and the *Alkalest*, 'tis pleaded that Bodies are ultimately reduced, may it selfe by a further and very simple operation of the fire be reduced into *Earth*.

I have somewhere mentioned, for I remember not in what Paper I have observed, *Salt-Petre* distill'd with Clay, to lose much more of its weight, than can be suppos'd to have ascended in the forme either of *Spirit* or *Phlegme*. And now to make this Experiment more short and easy, I shall add, that I lately made it in a Crucible, (instead of a Retort) wherein a double weight of finely powdered Tobacco-Pipe Clay, very well

well mixt with pulverized Chryftalls of *Nitre*, were kept three houres; in a violent fire, and then the mixture being taken out, the remaining fixt salt was carefully extracted, but amounted to very little in comparison of what *Nitre* was wont to yeeld, when calcin'd with Charcoal: and this scant proportion of fixt salt did not proceed chiefly, from a very copious Avolation of Nitrous substance, appear'd probable by this, that the *Caput Mortuum* was much more ponderous, than was to be expected, upon the score of the Tobacco-Pipe Clay, that was first employ'd, and the *Alcali* that was extracted; so that the new weight acquired by the Clay, seem'd manifestly to proceed, from the accession of a portion of the *Salt-Petre*, that by this operation was turned into *Earth*. Insomuch, that of six drachmes that four ounces of Clay had acquir'd, in weight, after the Crucible was taken out, not so many graines could even by boyling water be obtain'd from the whole *Caput Mortuum*; which when first taken out of the Crucible, was almost quite insipid. That

That Earth may be *de novo* produced, may likewise be probably argued from the Experiment, I formerly related about the destruction of the salt of *Tartar*, by igniting it and putting it into fair Water: for there remained after the numerous filtrations, and if I misremember not, after every one of them, a substance, in the filter, which, for ought appears, may be as well called *Earth* as that which was separated from the calcined *Tartar*, the first time it was put in the water, to divide the salt from the *Earth*. For in our Experiment as well as in the common operation, I come from mentioning, the way of proceeding is the same, and in both their remains in the filter a substance, which by its staying there, shews it was not dissoluble in the water, and which before it came thither, shewed, by its enduring a violent fire, that it was also fixt as *Earth* ought to be. Nor would it much move me, if it should be found, that this factitious *Earth* may have some such operation upon some particular Body, as is not thought to belong to true Elementary *Earth*.

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For since it is obtained by a Chymical *Analysis*, if it have those quality's that in the general estimations of naturalists, make up the notion of what they call *Earth*: I think that ought to suffice us, at least till the Chymists give us some more accurate notion of genuine *Earth*, and shew us such a thing, and teach us a better way of *Analysis*, to obtaine it.

For in many body's that are, without scruple, lookt upon as *Earth*, I observe quality's that do belong to the received notion of Elementary *Earth*. This I say, because I see not why such a Texture as will suffice, to make a portion of matter indissoluble in water, fixt in the fire, and insipid upon the tongue; may not also make it fitt to operate actively upon some Body's, and modify the operations of some others, that act upon it. And if our *Earth* from salt of *Tartar*, be rejected as spurious, they ought to confess the insufficiency of their common way of separating a true *Earth* from the Body's they Analyze: for it seems Calcination and solution in water, and filtration, which make up
their

their usuall method, will not suffice to make our *Earth* of *Tartar* pass for true; though it appear not to be near so remote from an Elementary nature, as some other Body's that are obtained from *Earth* by the vulgar *Analysis*. Of which I shall at the close of these notes give an Instance, in well dulcify'd *Quick-lime*, which according to the Doctrine of the Chymists, ought to be an Elementary *Earth*; and yet seems not more so, (if it be so much,) as our *Earth* from salt. of *Tartar*. And for the present, I shall add, that the *Caput Mortuum* of *Vitriol* remaining after it had long endured a violent fire, though it were diligently freed from saltiness, by reiterated Ablutions with hot water, was yet far from being an Elementary *Earth*, as appeareth not only by its deep purplish colour, and its ponderousness, far exceeding that of *Earth*, but by a tryal that I purposely made to examine it.

Upon this occasion I remember, that a Learned man of my acquaintance, who visited the Mines of *Hungary* (and dealt much in *Hungarian* *Vitriol*

Vitriol, affirmed to me, when I told him I conceived the *Caput Mortuum* of it to retain much of the Metal-line Nature, that he had upon a certain occasion out of the *Colcothar* of a certain sort of *Hungarian* Vitriol, not only received a pretty deal of good Copper, but separated from that Copper, a pretty portion of silver, and some grains of true Gold.

Before I put a Period to there Notes about *Earth*, though my Argument do not need nor require that I should do it, yet upon this faire occasion, I shall here take leave to doubt, whether such an *Elementary Earth*, as the Schooles tell us of, do yet appeare to be more than a Notional thing. For to what I have already said concerning the *Earths* supposed to be produc'd by Chymical *Analyses*, I shall now add, that I have not yet seen it proved, that *Nature* does any more then *Art*, afford us a true *Elementary Earth*; at least I can say, that some, which seem to be of the more simple sort, I found upon examination to have Qualities not ascrib'd

scrib'd to pure *Earth*. For though *Tobacco-pipe Clay* by reason of it's fixity, whiteness, and Insipidness, and it's lying oftentimes deep enough beneath the surface of the ground, may, as probably as almost any other Native *Earth* we know, be look'd upon as *Elementary*, yet *Tobacco-pipes* well baked may sometimes be made to strike fire: and I have more than once tryed, that by briskly rubbing two peices of a new *Tobacco-pipe*, one against another, they would in a Minute or two of an *Hour* grow warme, and being immediately smelt to, manifestly afford a ranke odour, between Sulphureous and bituminous, almost like that which proceeds from *Pebbles* or *Flints*, when they are likewise rub'd hard against one another. As if *Tobacco-pipe Clay* were not a true *Earth*, but a fine white Sand, consisting of Graines too small to be distinctly taken notice of, like those of other Sand. On which occasion I shall add, that I found by a Hydrostaticall Tryall, that it's specifick gravity was but little differing from that of *Pebbles*, its probable in weight

to water of the same Bulke being as two, and a quarter to one. A Tobacco-pipe may also be somewhat melted by a very vehement fire, (for a less will scarce serve the turne) as may be argued from this, that it may by such a fire be brought to bend.

Porcellane, or the matter whereof *China* dishes are made, is not, as some Travellers and Learned Men have fondly imagin'd, a composition that requires to be buryed underground, for I know not how many yeares, to ripen it into *Porcellane*: but as some late Authors informe us, and as I have been assured by a Person, that went purposely to that place in *China*, that is so famous for the making of *Porcellane* vessells, it is a pure sort of Clay, but yet this I find not to be *Elementary Earth*. For besides that I have observed, that a Violent fire will make it somewhat melt; I find that with steel, it will easily enough strike fire almost like a flint. The like I have observed in *Porcellane* very artificially imitated
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with a sort of *English* clay. And I found too, that the matter even of dark colour'd Juggs of the better sort, and well baked, would with a Steel afford sparkes of fire. I forgot to tell you when I was speaking of fine *Porcellane*, that I found its specifick gravity to be very near the same with that of Flints, and Tobacco-Pipe Clay. But I remember I went once to visit a Grove or Pit, where at the depth of divers Yards, they were wont to digg up a certaine white Earth, which distill'd by an acquaintance of mine afforded a Liquor, that was put into my hand to try, and which I found to be very rich in a Volatile Salt, that tasted and smelt much like spirit of Urine, or Harts horne, and had almost the same effects in changing the colours of some Body's, and precipitating of others. I remember too, that I found by the operation of a *Menstruum* or two upon *Tripoli*, that, as white and pure a Virgine Earth as it seem'd, yet it was not *Elementary*: & on the other side a Master of some *English* Mines having presented me, among other Mineralls, which he
knew

knew not what to make of a very white substance, whereof he had store, which he thought an *Earth*, and which was judged by an Excellent Artificer, much conversant with *Tripoli*, to be finer even than that *Earth*, I guess'd it upon Examination to be a kinde of *Talcke*, whose leaves were exceeding fine and minute. The Result of these relations may be, not only that we may yet retaine our doubts, whether the Assertors of *Elementary Earth* can shew us any Native substance, that deserves that name: but also, whether those things that remaine after Chymical *Analyses*, though they have all the Qualities that are judged sufficient to denominate a portion of matter *Earth*, may not yet either be compounded Body's or be endowed with Qualities, which belonge not to simple *Earth*. To explaine and confirme which, I shall give an instance in some *Quick-lime*, that I purposely examin'd. For though it had been, by frequent ablutions in warm water, carefully dulcified, and so was as well insipid, as fixt, and indissoluble in water: yet I found, I could

readily dissolve it in divers *Menstruum's*, and even in spirit of Vinegar, whereas true *Elementary Earth* ought to be as well indissoluble in such liquors, as in water.

If I had not been to deal with Chymists, but Aristotelians, I might have sav'd my self the labour of solicitously endeavouring to prove, that Earth and water may each of them be produc'd from Body's of a differing nature from it. For though the Peripateticks will not allow *the whole Elements* to have been produc'd, because they looke upon them as integrant parts of the world, which *Aristotle* laboriously (though not solidly) maintaines to be eternal: Yet the *Portions of the Elements*, they will have to be interchangably transmutable. So that what was once water may be Earth, and Earth may by intermediate alterations, be turned into water.

But those I have to do with, being the vulgar Chymists, who will have the material principles or simple ingredients

ingredients of mixt Bodies, coevall with the World, and uncapable of being either destroy'd or produc'd; it was not allowable for me to proceed upon the *Aristotelian Hypothesis*, of the transmutableness of what they call Elements, especially because, that though I do admit it, as 'tis, according to my opinion, a part of a more general truth; yet I do not think, they have well prov'd it by their Arguments: which since I my self do not like, I think 'twere disingenious to press them upon others. And without having recourse to their Doctrine, there will occur some other particulars, that may be added to those already mentioned, to countenance the producibleness of the Principles of mixt bodies, in some other papers that are to follow these Notes. Though in strictness I was not oblig'd to say so much, as I have already said, since pretending to call in question no more than the *three Hypostatical Principles of the Chymists*, I might easily have excus'd my selfe, for having let alone the production of *Water* and *Earth*: since the generality of Chymists reckon
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not those Bodys amongst their *Hypostatical Principles*; but looke upon them, as recepticles, or, as others would have them, Recrements of these, or, as on some other account, related to them. But I was not willing to omit *Water* and *Earth*, because some of the more learned of the modern *Spagyrist*s have adopted them, into the Number of the *Principles* of mixt bodies, and because I finde by experience that in Chymical *Analyses*, they are at least as often to be met with, as some of the *Principles* confessedly Hypostatical. But what has been delivered about *Earth* and *Water*, having much added to the bulke of these Notes: 'tis time I should put a period to this part of them, in reference to which I hope it will be considered, that I do not pretend that every single experiment by me alleg'd, do's sufficiently prove, that the body obtain'd by it, was in the strictest sence *produc'd*. For if the several experiments, and other proofes do in conjunction, and as it were in a body, make up a good Argument, that the ingredients they relate to, may be produc'd;

produc'd; 'tis as much as will, I hope, be expected, from these Notes, which having been written by way of Appendix to the *Sceptical Chymist*, may be allow'd, as well as that book, to employ *some* Proofs, not altogether cogent, and may be judg'd not improper, though some of the Arguments propos'd in them to show that *Chymical Principles* are not all ingenerable and indestructible should be but meerly probable. And yet this I shall venture to intimate, that vulgar Chymists and *Aristotelians* may, not perchance, find it so easy a thing, as 'tis like many of them will imagine, confute divers passages of the foregoing Tract, since probably their objections will suppose some thing or other, which though taken for granted among them, and perhaps by several other learned Men, I do not admit as true, or think demonstrable, but rather questionable upon very rational grounds. And though perhaps I should not have brought in some of the Experiments mentioned in the preceeding Notes, if I had not had a mind to throw together what I thought
might

might contribute to so usefull a thing, as a *Natural History of Chymical Principles*; on which others, if not I, may hereafter ground a Theory of them; yet this may also deserve to be considered, that if *any* of the foregoing Experiments, though never so few, do really prove, (as 'tis like some of them will be judg'd to do) that *any one* of the Chymical Principles may be, *de novo, produc'd*; that alone will suffice destroy the *Universality* and *intireness* of their *Hypothesis*; and besides give cause to suspect, that by further industry, the Producibleness of other Principles also, may be discovered.

F I N I S.

